THE IRON AGE

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THE IRON AGE

New York, Thursday, April 25, 1907.

A Powerful Gun Handling Crane.

A 225,000-Pound Wellman-Seaver-Morgan Gantry Crane and Transfer Car.

The present arrangement of the Indian Head Proving Ground is the result of its unexpected growth in the last 15 years. During this time it has developed from a small beginning, when testing comparatively few guns, until at the present time the navy yard is turning out a very considerable number of heavy guns which must be handled quickly and economically. For the latter purpose the Wellman-Seaver-Morgan Company, Cleveland, Ohio, has installed a special gantry crane, in accordance with the general plan and specifications of the Government engineers, to take the place of a crane which had become worn and too slow in operating for the present heavy ordnance.

All ordnance to be tested is mounted on special trucks at the Washington Navy Yard, which are run on large steel barges and towed 25 miles down the river by powerful Government tugs. Part of the track system is of narrower gauge than the crane and has two large turntables. It is therefore necessary to have a transfer car under the gantry when handling and carrying the guns over to the concrete platform where the guns mounts are located. Upon arrival at the proving ground the guns are run off the barges at the pier by a locomotive crane and are placed under the gantry crane at the first turntable. The guns are raised from the trucks by this crane, which, with the transfer car, is then pushed over to the concrete firing platform on the other side of the yard. After being turned on the second turntable the gantry crane is run off from the transfer car on suitable rails bedded in the firing platform to a point where the gun can be lowered directly into the mount ready for testing. Fig. 1 shows the crane near one of the testing mounts, and Fig. 2 its appearance in transit through the yard.

The lift and main travel of the gantry crane are operated by electric power. The lift with the maximum load is made at the rate of 8 in. per minute. The lifting yoke is suspended from an 8-in. nickel steel screw with special thread running through a bronze nut, which turns on a hardened steel cone roller bearing, and is operated by an Albro-Clem bronze worm wheel and worm. The latter is secured to the shaft of a 30-hp. moter, which may be seen in Fig. 1 on a bracket at the top. The trolley travel, which is seldom used, is arranged for operating by hand. The whole trolley, instead of being supported on wheels, is a steel casting resting on two sets of hard steel rollers, and is operated by a screw shaft, with a chain wheel at one end of the gantry. The bridge travel is operated by a 20-hp. motor located near the center of one of the crane girders through a train of mechanism that is clearly shown in Fig. 2. The speed of this motion is approximately 30 ft. per minute. The gantry crane itself is provided with three wheels under each pair of legs, which has the advantage over the use of two wheels that it avoids shocks and jars while passing over the rail gaps between the transfer car and the platform.

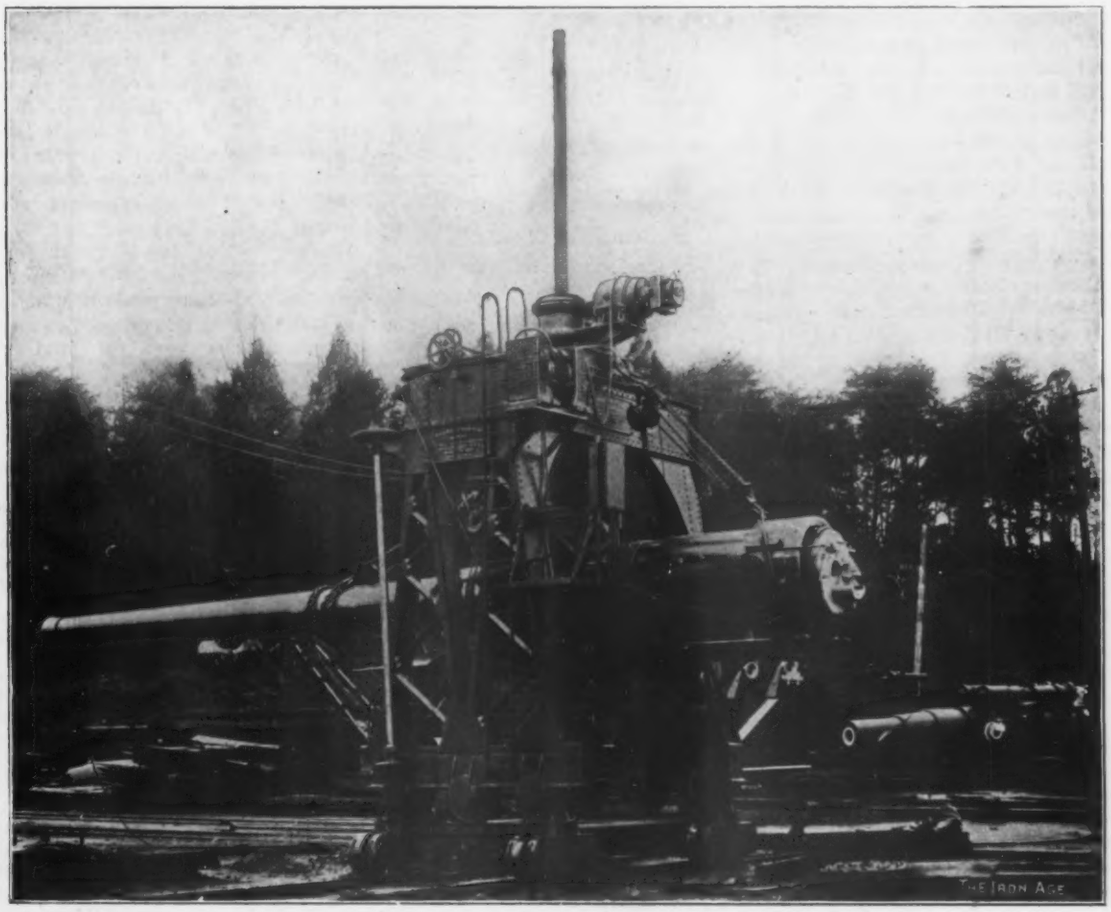


Fig. 1.—The 225,000-Lb. Gantry Crane and Transfer Car Built by the Wellman-Seaver-Morgan Company for Handling Guns at the Indian Head Proving Ground.

All of the motors are wound for 600-volt direct current and are Westinghouse waterproof, series wound motors. The current is furnished from a large power-house connected with the smokeless powder factory. The controllers were furnished by the Electric Controller & Supply Company, Cleveland, Ohio, and are located on a bracket platform attached to one of the four legs of the gantry, high enough to permit of its going between the gun mounts, which are located rather close together on the firing platform.

The test load of this crane was required to be 25 per cent. over the rated capacity, or a weight of over 280,000 lb. The load was finally made up by piling 10 x 12 ft. pieces of armor plate on top of each other, and the crane successfully lifted this heavy load at the rate of 6½ in. per minute.

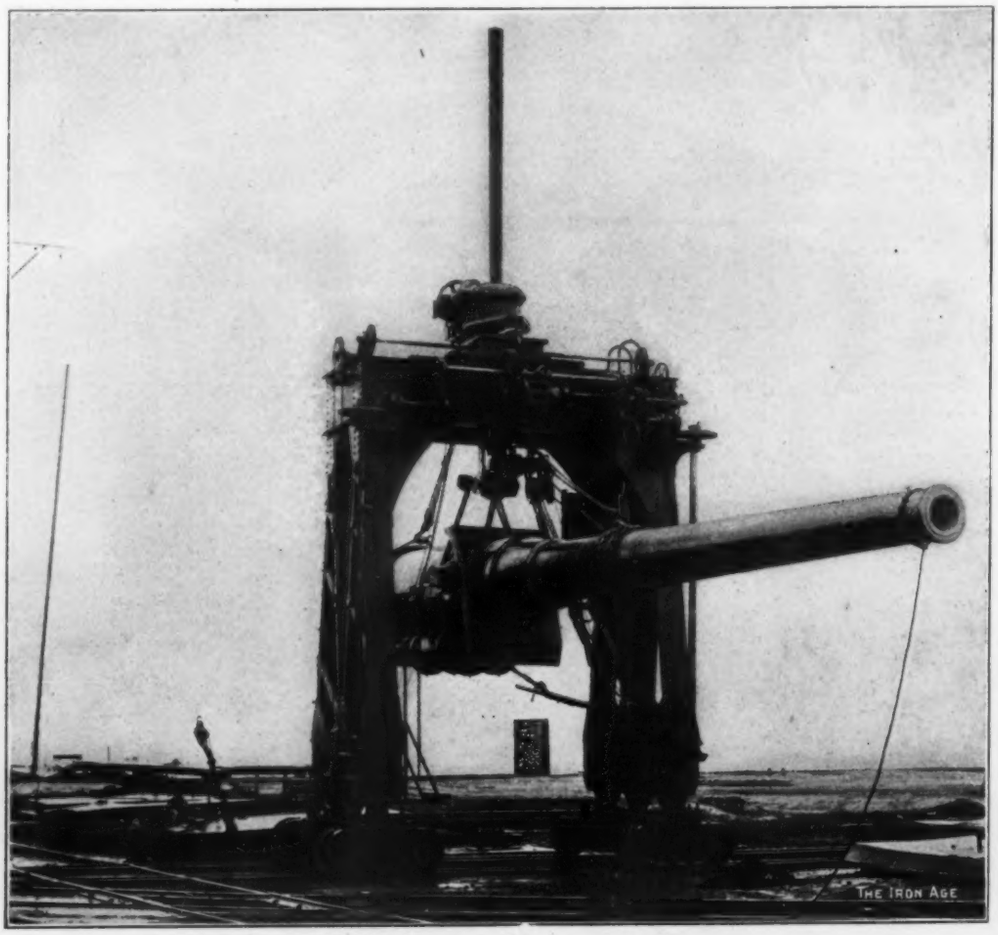


Fig. 2.—Another View of the Crane, Showing the Bridge Travel Mechanism and the Manner of Suspending a Heavy Gun.

A Canadian Pipe Foundry.—The Canadian Iron & Foundry Company, Limited, whose head offices are at Montreal, is building a large pipe foundry at Fort William, Ont. The plant is being constructed on a new plan which provides for a system of continuous operation, and will have a capacity of from 75 to 150 tons a day, depending on the number of hours run and the size of pipe cast. Besides the pipe works, a large general foundry and car wheel shop is being built, together with a machine shop of correspondiing capacity. The plant will be operated by electric current obtained from the Kakabeka Falls. The electric installation will include a three-phase 60-cycle 550-volt generator, which will operate the ordinary motors, but the crane equipment and special motors will be driven by 220-volt direct current from the plant substation, where two motor generator sets will be installed. The pipe foundry will be supplied with two quick travel Niles cranes of 10 tons capacity each, while the machine shop and gray iron foundry will have two 25-ton Niles cranes, 50-ft. span, geared for moderate speed, provided with 5-ton auxiliary hoists. The buildings of this plant were designed by T. Pringel & Son, Limited, Montreal, and the system adopted for the making of pipes was developed by G. R. Duncan, the engineer in charge.

Child Labor Investigation.

It is expected that the investigation of child labor in the United States, which will soon begin under the auspices of the National Bureau of Labor, will be a most thorough inquiry. The appropriation for the work is $150,000. Some comment has been made on the fact that such an inquiry should be undertaken following a report on child labor in the United States based on information gathered in connection with the twelfth census. In answer it is stated that the census information is not up to date, and that it deals only with children above the age of 10 years, while many conditions regarded as most objectionable grow out of the employment of children under the age of 10.

The inquiry soon to be undertaken will be primarily sociological, dealing with conditions of child labor, factory sanitation, family life as affected by the labor of young children, distribution of ownership of child employing mills, and other factors tending to show just where the responsibility rests for existing evils. Field work will probably not be undertaken until the early part of the summer. Meantime preliminary studies will be made in the offices of the Bureau of Labor and the plan of the work mapped out.

The University of Wisconsin, Madison, Wis., announces that its summer school for artisans, under the direction of the College of Engineering, opens June 24 and ends August 3. Engines and boilers, applied electricity, machine design, materials of construction, fuels and lubricants, shop work and manual training constitute the seven departments of instruction.

Canada's Unfolding Trade Relations.

British Preference.

TORONTO, April 20, 1907.—On one or other of their many sides Canada's external trade relations are likely to be strengthened in the early future. One quarter on which attention is now fixed is Great Britain. Though the present British Government is bound to free trade by the pre-election pledges of its members, Canadians have not ceased to hope that their wheat, and possibly other foodstuffs, may receive a preference in the British market. At the congress of chambers of commerce of the Empire held in London last year the preferentialists were strong enough to carry a resolution affirming their policy as the one most conducive to the commercial welfare and unity of the Empire. The large number of chambers in the United Kingdom that supported the resolution, compared with the limited number voting for a similar one at the congress held four years before, was very striking and seemed to mark a great reaction from free trade. The London chamber, whose delegates did not vote on the resolution at the congress last year, has declared itself in favor of mutual preference among the principal States of the Empire. Canadian preferentialists are further encouraged by the defeat of Government candidates in some of the by-elections, defeats changing great Ministerial majorities into large Unionist majorities. There is a strong conviction in the English speaking provinces of Canada that Mr. Chamberlain's campaign accomplished its object. That his opponents triumphed at the polls was, it is held, a consequence of the unpopularity of the Balfour Government, irrespective of the question of trade policy. Now that the Campbell-Bannerman Government has forfeited some of the confidence so unreservedly given to it, it is felt that the Chamberlainites' opportunity is not far distant. The attitude of the Canadian Government on this question was described by Sir Wilfrid Laurier in the House of Commons about a fortnight ago in the following language:

> The only question in which we are interested, and the only question we intend to bring before the conference, is the question which absorbed most of the time of the last conference—the trade question. And upon the trade question we have nothing new to offer. Mr. Borden has stated that the resolution adopted by the British Conference in 1902 was adopted at the suggestion of Canadian Ministers. Such as our policy was in 1902, such it is in 1907. We have given to the British people a preference under our tariff. This we have done for our benefit and for the benefit of the relations which exist between us and the mother country. But we have stated that if it suits the British people to reciprocate we shall be prepared to discuss the question and go a step further than we have yet gone. Now we have nothing to say upon this point. This policy which we have suggested has not met with favor in Great Britain. It is not for us at this moment, and it is not for me on behalf of the Canadian people, to press this matter on the British people.

Trade with the British West Indies.

When Sir Wilfrid Laurier reached Halifax a few days ago, on his way to attend the Colonial Conference, a communication was handed to him in which was expressed the desire of the Board of Trade of that city that he should bring before the conference a proposal for a preferential arrangement between the British West Indies and Canada. As a matter of fact, the Halifax Board's idea seemed to be that preferential tariff rates should be established in the British West Indies for the advantage of all parts of the Empire that should choose to reciprocate. At the present time the sugar of the British West Indies is admitted into Canada at a preferential tariff rate, but the islanders complain that the benefit of this preference goes not into their pockets, but into those of the refiners and of the New York dealers through whom the sugar is handled. From time to time representatives of the islands have made approaches for closer trade relations with Canada. They have awakened interest in commercial circles, if not in political circles, in this country. Recently the boards of trade of Toronto, Montreal, St. John and Halifax united to send a commission to the islands. That commission, of which J. D. Allan, a Toronto man, is chairman, has now returned and will shortly issue its report. The Halifax Board had heard the views of its member of the commission before preparing the communication which was handed to Sir Wilfrid Laurier. In an address delivered before the Toronto Board of Trade on April 10 Mr. Allan spoke quite enthusiastically about the prospects for Canadian trade in the markets of the British West Indies. He expressed the opinion that the West Indies would be a most valuable commercial connection from the beginning, but would be particularly so with the Panama Canal in operation. The commission will recommend more frequent and more rapid steamship communication between Canada and the island, greater pains to suit the tastes of tropical consumers, more enterprise on the part of Canadian traders, and reciprocity of tariffs.

Quid Pro Quo with Germany.

In the Senate on April 11 Sir Richard Cartwright, Minister of Trade and Commerce, stated that Sir Wilfrid Laurier had with him copies of Canada's new intermediate tariff, which it was thought might be laid before some of the European statesmen Sir Wilfrid would be likely to meet in the course of his travels on the Continent after the conclusion of his labors at the conference. It is supposed that the Minister of Trade and Commerce had special reference to negotiations with Germany to put an end to the tariff war between that country and Canada. In 1897 Germany showed resentment at Canada's action in withdrawing from the commercial treaty between Germany on the one side and the British Empire on the other. This withdrawal released Canada from the "favored nation" obligation to Germany, and the latter country, accordingly, was barred from the Canadian preference in favor of Great Britain. Germany retaliated by depriving Canada of the conventional tariff privileges, the effect being to stop the growth of Canada's farm exports to the German market. After suffering this discrimination for several years, Canada struck back by means of the surtax, which increases the duty on German goods by one-third of the regular tariff rates. This wiped out a large part of Germany's export business to Canada, especially that in iron and steel and their products. It apparently had an influence upon the German Government, for there were soon overtures from Berlin to settle the tariff difference. What progress has been made along this line is unknown to the public, but there appears reason to believe that the disagreement will be brought to an end. If Germany gets the benefit of Canada's intermediate tariff, France must likewise have its privileges, for Canada's commercial treaty with the latter nation contains the most favored nation clause.

Possible Terms with the United States.

In the official announcement from Washington of a forthcoming treaty between Great Britain and the United States covering relations between the latter country and Canada no mention is made of tariff concessions. The inference is that reciprocity is not on the list of questions it is now agreed to settle by treaty. This view is strengthened by a statement made on March 27 by the British Under-Secretary for the Colonies in reply to a question put to him in the House of Commons as to the status of the negotiations with the United States. He said that reciprocity was not being pressed on the part either of the United States or Canada, and would not, he assumed, be one of the subjects of the treaty in which the negotiations were expected to conclude. While it has thus been made clear that the trade relations between the two countries are not involved in the current treaty-making, it is by no means regarded as a foregone conclusion that there will be no reciprocity. That might be established, as has often been suggested, not by treaty but by correspondent legislation. Canada's new tariff act leaves the government independent of Parliament in the matter of conceding the intermediate duty rates. If Congress were to make any abatement of the Dingley duties as toward Canada, Sir Wilfrid Laurier could reciprocate without delay by proclaiming the intermediate tariff to be in effect in relation to imports from the United States. If the Canadian Government would exchange the benefits of its low intermediate tariff for the benefits of Germany's high conventional tariff, it would not be likely to insist on an absolute equivalence of American concessions in return for the privileges of its intermediate tariff.

C. A. C. J.

The First Electrically Driven Reversing Mill.

Mill for Rolling Billets, Rails, &c., at the Hildegarde Works, Austrian Silesia.

The management of the Hildegarde Works at Trzynietz, Austrian Silesia, in connection with plans for enlargement and reconstruction, called upon the Allgemeine Elektrizitaets Gesellschaft to develop a scheme for the centralizing of the work. This led to the design and installation of the first electrically driven reversing mill, which was described in full before the Verein deutscher Eisenhuettenleute by Geyer of Berlin, in December last.

The central station consists of a 3000-kw. turbo dynamo built by the Bruenn Works and two Allgemeine 1250-kw. turbo dynamos.

Characteristics of the Mill.

The existing reversing mill consists of four stands of rolls of 29.55 in. average diameter, and it is used for rolling 2-ton ingots into billets, beams up to 27.75 in., rails, &c. The principal dimensions for the beam ingots are 16.56 x 18.52 x 67 in. The two-cylinder Wetter engine which had been used for operating the mill had 47.28 in. cylinders and 49.25-in. stroke and worked with an initial pressure of six atmospheres. A series of indicator diagrams and speed diagrams was taken, the results of which are illustrated in the original printed in *Stahl und Eisen*. These showed that at times the power requirements ran up to 8000 hp. and at other times dropped to nothing. The causes leading up to the design adopted are thus explained:

Owing to the great fluctuations in the power requirements for a reversing mill, direct operation from a central station would be impracticable, since the mill alone would require a reserve of 8000 hp. to 10,000 hp. in power plant machinery. It follows from this that wiring, machinery and the like would also have to be designed for these momentary peak loads. Hence, if electricity is to be applied to this class of work with commercial success, it is essential that some method should be found that will smooth out the load demands to some constant which will fairly represent the average. The energy requirements in reversing mill work are so rapid in their changes and the amounts of power used so large that purely electrical methods depending upon storage batteries or resistances would be very difficult even if the necessary control apparatus could be built.

The solution of this problem appears to be offered by the Ilgner motor generator flywheel system, already well known in connection with the operation of mine hoisting machinery. The electrical factor entering into the Ilgner method is the Ward Leonard motor generator control which has been widely used in other lines of industry for over a decade. This equipment consists of a motor driven by a generator called a "starting machine." The latter is not excited by current while the motor is stationary; that is, it may be kept running while under no load. As the current collectors of the starting machine are electrically connected with the collectors on the motor, the application of current to the generator sets the motor running. This movement is due to the magnetic field induced in the armature of the generator (previously running without load), which causes an electromotive force to flow through and start the motor

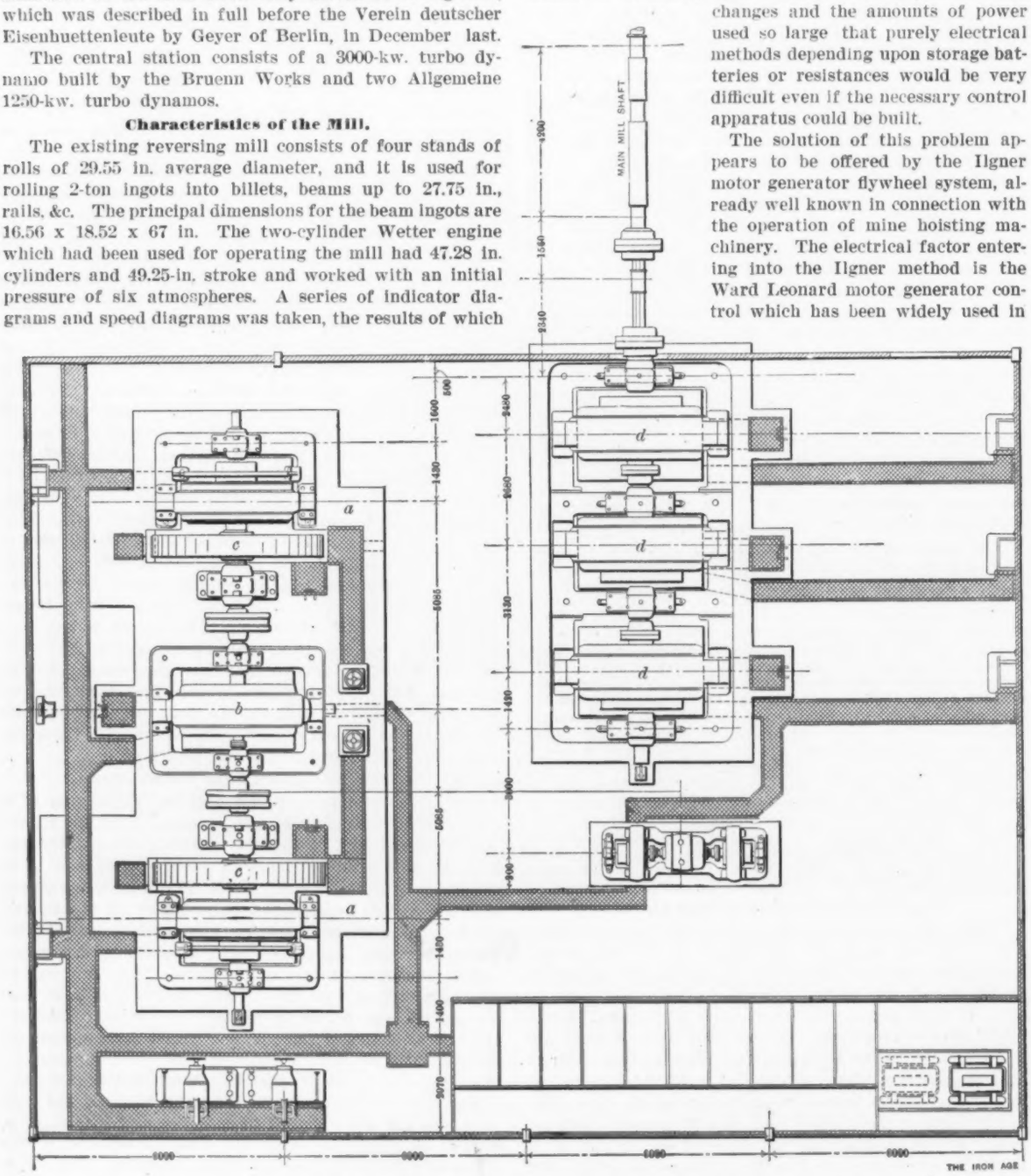


Fig. 1.—Arrangement of Electric Drive of Reversing Mill at the Hildegarde Works, Austrian Silesia.

armature. The voltage at the motor terminals depends upon the exciting current of the generator and hence the speed of the motor varies with the amount of generator excitation; the direction of motor rotation also depends upon that of the exciting current. Since the current thus required to excite the field of the generator is but a small portion of the total capacity of the generator, it follows that the speed control apparatus can be easily constructed and operated. Another consequence is that no energy is lost in starting and regulating the motor between no load and full load, as the power taken is always proportional to the motor speed and voltage, which is controlled by regulating the generator excitation.

The Electrical Apparatus.

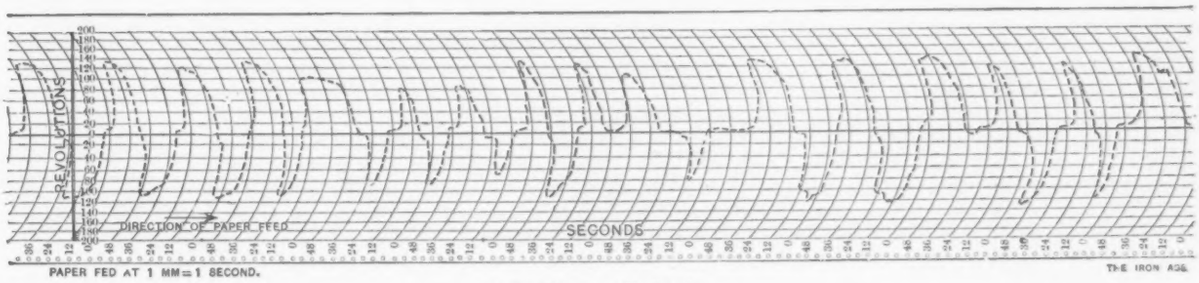
A glance at Fig. 1 shows that in this case the starting machine *a*, on the left, is divided in two, each half being symmetrically arranged on opposite sides of a 3000-volt induction motor, *b*, which drives the two generators. The fluctuations in energy appearing on the circuit are equalized by two 26-ton flywheels, *c*, revolving at the circumferential speed of 262 ft. 6 in. per second, which corresponds to the 375 rev. per min. of the motor generator set. The importance of the flywheels of course is well known; where such large rotating masses are used for doing work, it is necessary that the speed of the motor thus supported (in this case, the induction motor) shall decrease with increasing loads. It is clear that a direct current shunt wound generator, for example, would never give the flywheel coupled to it a chance to do part of the work either in a rolling mill or elsewhere. The same is true of an induction motor with short circuited windings which allows only the very low slip of about 2½ per cent. between no load and full load. Indeed, the motor must be capable of considerable slip, which quality is attained in direct current motors by compounding the field and in induction motors by inserting resistance in the rotor. Where it is desirable to have a definite regularity in slip, some special device is necessary to insure the desired relation between the flywheel and motor. In this installation, this slip control is secured by moving up and down the weights forming the electrodes of a rheostat of acidulated water. The resistance is regulated automatically by a small auxiliary motor the armature of which moves only a few degrees in either direction corresponding to the hub of the resistance weights. The armature of this auxiliary motor carries for this purpose a balance beam, from one end of which are suspended the electrodes or resistance weights and from the other a set of balancing weights. The auxiliary motor itself is in circuit with the field current of the large induction motor. Hence the rotating element of the auxiliary motor is subjected to the three turning moments due to the electrodes, the balancing weights and the turning moment of the motor. Now when the average power required by the rolling mill is being taken from the circuit, these moments are in equilibrium; but as the current supplied to the large induction motor increases, the turning moment of the auxiliary motor grows as the square of this increase, and thus disturbs the balance of the three moments. This unbalancing raises the resistance electrodes and thereby increases the slip so that the flywheel is obliged to give up its energy until the equilibrium of the turning moments is restored. Any desirable average power requirement can be fixed by changing the counter weights on the balance beam.

The action of this slip regulator is instantaneous, since there are no relays or other choke-off devices in the circuit. The resultant effect of this method is that about 1000 hp. steady input suffices for a rolling mill where the momentary power needs rise to 10,000 hp. The slip of the motor generator set is between 375 and 320 rev. per min. The speed occasionally drops to 300 rev. per min. when working on cold ingots.

The Ilgner motor generator sets noted on the left in Fig. 1 consist of a 2500-hp. normal capacity alternating current motor coupled to a pair of generators of 1500 kw. normal rating, with a total maximum of 4300 kw. at 300 to 375 rev. per min., together with two 26-ton flywheels. On the right is shown the rolling mill drive, consisting of three coupled motors, *d*, with a total normal rating of 3600 hp. and a maximum of 10,350 hp. at 110 rev. per min.

The motor generator sets are so mounted that each shaft is carried by two bearings, the power being transmitted on both sides of the motor to the flywheel shafts through flexible couplings of the Polysius type. Ball bearings have been systematically abandoned for flywheel transformers because the necessary axial play of the shafts caused breakages of the balls and of the bearings. The bearings are water cooled and the rims of the flywheels are accurately machined in order to reduce air resistance.

It takes about eight minutes to carry the motor from the position of rest to the full speed of 375 revolutions.



Mill Motors at No Load.

Fig. 2.—Revolution Diagram of Electrically Driven Reversing Mill.

the power drawn from the alternating current motor being 500 to 800 kw. The power requirement of the flywheel transformers without a load amounts to about 120 kw. The two work in series and together when fully excited yield 1000 volts. The drive motors are provided with the Deri compensating winding and are built for a nominal yield of 1500 kw. and a maximum yield of 3750 kw. at 500 volts. For exciting the starting generators and the reversing motors there are two small dynamos. The starting and reversing of the mill are done with a single lever.

At the two reversing mills at the Resicza Works, now in course of erection, there are two mill motors which are naturally greater in size. Similarly two motors will be used for the reversing mill at Rombach, with a capacity of 15,000 hp., while the fifth electrically driven reversing mill, that of Huesten, will have a single 7500-hp. motor.

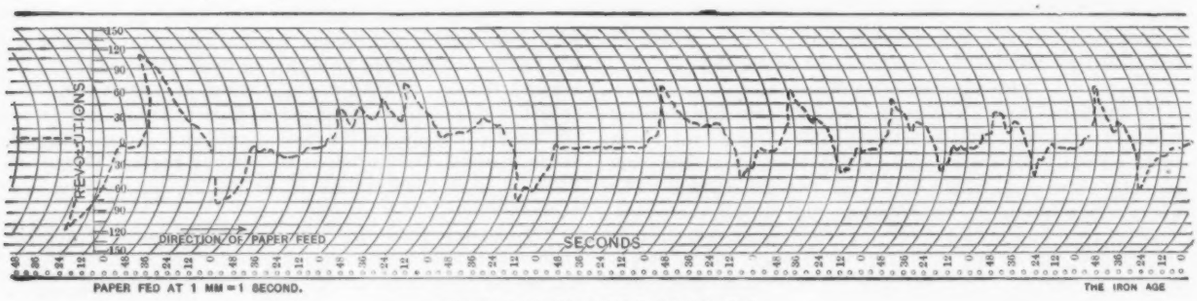
The three drive motors at the Hildegarde Works are coupled electrically in series so that they may be regarded as a single machine. Each motor is mounted on a shaft which is firmly coupled with its neighbor, all three of the motors being on one bedplate.

Operating Curves.

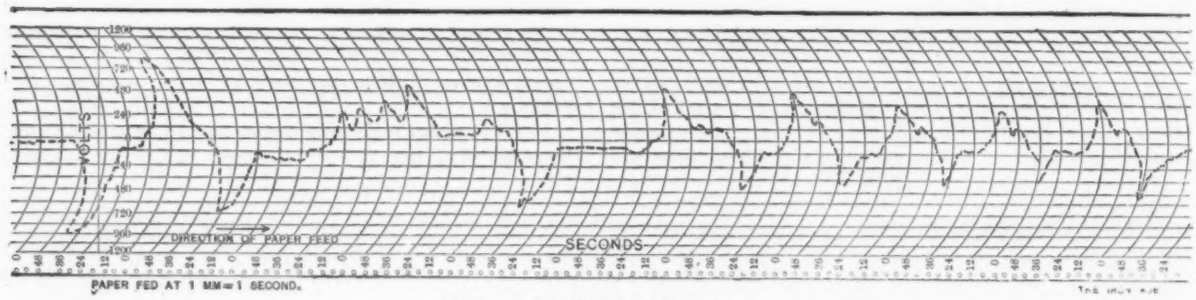
It will now be of interest to examine and discuss the operating curves which record the work of the first electrically operated reversing mill. The contract with the Hildegarde Works specified that the rolling mill motors should be capable of reaching their full speed within four seconds after starting, and this was fully complied with in operation, the speed of 110 rev. per min. being easily reached under the calculated power conditions. In fact, it was found possible to reach the speed mentioned in

two to two and one-half seconds throughout the entire installation. Fig. 2 shows a series of speed measurements taken to determine the maximum periods of bringing the motors to full speed while the mill was running empty. The recording lines were marked on the moving paper strip at intervals of six seconds. By following up a curve from the zero line to a stroke corresponding to 110 rev. per min. it will be noted at many points that the acceleration took place in two to two and one-half seconds. Further, it will be seen that it is possible to reach 140 rev. per min. and more, which feature is very welcome for the last steps.

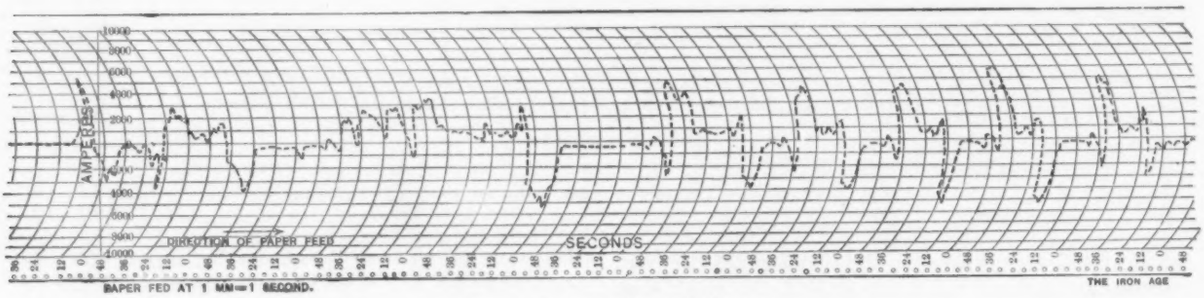
Another point to be noted, and one which appears repeatedly in the later speed diagrams during the rolling process, is that in reversing with electric motors there is practically no standstill at zero because the reversing lever is immediately shifted from the highest speed above zero to the opposite direction; the opposite electromotive force thus is brought to the motors and without any injury whatever to them. In rolling mill work these rapid accelerations are used according to the demands of the process, even though different control methods are evolved under electrical conditions. Taking the upper speed diagram of Fig. 3 as an example it is seen that in rolling billets from ingots weighing as much as 2 tons, the engineer before the arrival of the piece keeps the apparatus moving at 10, 15 or 20 rev. per min., corresponding to the maximum peripheral speeds of the rolls at the time they grasp the metal. At that moment the speed curve drops considerably, in accordance with the view that the rolling



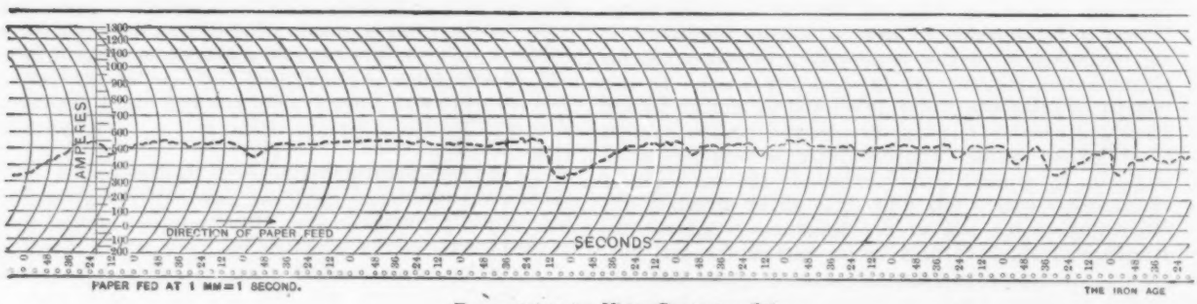
R.P.M. of Direct Coupled Mill Motors.



Voltage of the Rolling Mill Motors.



Current taken by Rolling Mill Motors.



Energy taken by Motor Generator Set.

Fig. 3.—Diagrams Taken from the Electrically Driven Reversing Mill When Rolling Billets.

mill motors are heavily compounded—that is, their speed must decrease as the current increases, differing from steam operation in the fact that the motor does not stand still under these conditions. At the same time the current circuit is opened, the turning moment rapidly increases and the ingot rushes through the first pass. The no load portions of the curves vary in length in accordance with the different periods required for turning and manipulating the ingot from one pass to the next.

Even during a pass slight speed variations are observed, which are caused by a momentary slipping of the ingot between the rolls. The number of curve areas gives

the total number of passes required for the complete rolling process. In Fig. 3 it is shown that 15 are required from the ingot to the finished billet. In rolling 27.75-in. beams there are 25 passes shown in the diagrams published in *Stahl und Eisen*. The second diagram in Fig. 3 registers the voltage of the starting machines and coincides very closely with the speed curve of the mill motors, which shows how well the latter meet the conditions.

It is of more interest to study the current requirements of the rolling mill motors, as shown in the third diagram of Fig. 3. At first there is a rapid rise in current to overcome the inertia of the motor and the friction in other parts of the machinery; the curve then drops to the normal current demand when running without load, at which point it remains until the ingot is seized by the rolls. Measuring the power used, it is found that when running empty the motor is taking 500 to 600 amperes at 200 volts. This shows 100 to 120 kw. as the power required for reversing the mill when running idle. Even at this minimum there are no resistance losses, as the starting machines themselves are excited for only 200 volts. The high peak in the diagram which follows is induced by the pressure exerted on the material being rolled, as well as by the simultaneous acceleration of the motor from 20 rev. per min. to its full speed of 110 rev. per min. The back of the peak shows an immediate fall of the current to zero as the operating lever is brought to that position right after the maximum. The turning back of the operating lever involves a powerful braking of the mill, the motors temporarily acting as generators by returning power in the form of braking effort. The first triangular area, with a considerably high peak, gives in every case an idea of the magnitude of this braking.

The lowest curve in Fig. 3 shows, as it were, the energy equalization due to the use of flywheels. To show the variations from the average with greater clearness an enlarged scale was used for showing the vertical strokes made by the wattmeter registration. In rolling billets the current ranged from 0 to 5500 amperes (corresponding to 0 to 4000 hp.) at the rolling mill motors, but at the large induction motor the differences were only about 50 kw. either way, a variation so small as to be of no consequence in a power plant generating 4000 to 5000 kw. An unusual variation, which occurs at another point does not exceed more than 4 per cent. This fluctuation was due to an accidental stop caused by the transfer of the ingot over a stand not in use. The largest draft of power upon the system in rolling billets is 500 kw. The slip regulator is set for this quantity and this maximum requirement upon the electric system is not exceeded under any circumstances in the rolling mill programme adopted.

Conclusions.

Practice at the Hildegarde Works has shown that the reversing mill is the most satisfactory consumer of current from the general electric installation, because the rotating masses of the flywheels act as a quieter of the whole system. The consumption of power by the reversing mill may certainly be neglected when comparing it with the fluctuations caused by several three-high mills at the Hildegarde Works, although these fluctuations themselves are without any disadvantage to the central station. A train of medium size has been in operation there for a longer period, the electric motor driving the mill directly, without the intervention of any flywheels, which could not be put in thus far for lack of time. The shocks at the beginning of the pass are instantaneous, and according to the reduction vary between 100 and 1200 hp. A heavier train is drawn by the same size motor, with the aid of a 50-ton flywheel running at 1214 ft. circumferential speed. When the train is running rapidly the equalization is almost perfect. When there are longer stoppages there is a gradual rising and falling of the load between the range of 120 and 1000 hp.

The electric drive for reversing mills is advantageous only where it is desirable to concentrate the majority or all of the power units in one electric central station. To operate a reversing mill electrically for itself would be a mistake from an economic point of view. But when the general tendency is considered of utilizing waste furnace gases, aided by the gas engine and the steam turbine, then it is readily understood how the aim is to secure for the reversing mill the high utilization of heat and the other advantages which accompany centralization of power. It is not denied that great progress has been made recently with steam engines for driving reversing mills, yet the electric drive is simple in construction and operation. It is amazing to watch how quiet and uniform is the development of power, and to note the absence of shocks in the couplings and rolls, so that breakages and cobbles seem to disappear altogether. Since July 27 the mill has operated steadily. Thus, recently, rails of 70 lb. per running yard have been rolled in 164-ft. lengths from 1.8-ton ingots in 21 passes, the slip regulator being set at 1200 kw.

The power requirements drawn from the electric station amount to less than 20 kw.-hr. per ton in blooming. In rolling billets, beams and rails the power requirements range from 25 to 60 kw.-hr. per ton of finished product starting with the ingot.

The Iron and Steel Institute.

The annual meeting of the Iron and Steel Institute will be held at the Institution of Civil Engineers, London, May 9 and 10, 1907. The new president, Sir Hugh Bell, will be inducted into office, and at the first day's session the Bessemer gold medal for 1907 will be presented to J. A. Brinell, Stockholm. The awards of the Andrew Carnegie gold medal and research scholarships will be announced, and reports on work carried out in the past year will be submitted by Carnegie research scholars in several countries. The following papers will be submitted at the meeting:

"The Use of Steam in Gas Producer Practice," by W. A. Bone and R. V. Wheeler.

"Sentinel Pyrometers and Their Application to the Heat Treatment of Tool Steel," by H. Brearley and F. Colin Moorwood.

"Induced Draft with Hot-Air Economizers for Steel Works and Blast Furnace Boilers," by A. J. Capron.

"The Influence of Process of Manufacture on Some of the Properties of Steel," by F. W. Harbord.

"The Distribution of Sulphur in Metal Ingot Molds," by Joseph Henderson.

"Steel Making from High Silicon Phosphoric Pig Iron by the Basic Bessemer Process," by Arthur W. Richards.

"Steel Making from Pig Iron Containing Chromium, Nickel and Cobalt," by Arthur W. Richards.

"Electrically Driven Reversing Rolling Mills," by D. Selby-Bigge.

"The Ageing of Mild Steel," by C. E. Stromeyer.

"Carbon-Tungsten Steels," by Thomas Swinden.

"The Nomenclature of Iron and Steel." Report of a Committee of the International Association for Testing Materials.

An invitation has been accepted to hold the autumn meeting of the Institute in Vienna on September 23, 24 and 25. The last Austrian meeting was held 25 years ago. Among Austrian works to be visited in September are those of the Prague Iron Industry Company, the Austrian Alpine Mining Company and the Witkowitz Mining & Iron Works Company.

When the Pittsburgh Foundrymen's Association holds its meeting in June, the members will be extended an invitation by the S. Obermayer Company, manufacturer of foundry facings and supplies, to inspect its new plant just completed at Rillton, Pa. This plant is the latest addition to the company's factories, which now comprise five in number, and are located at Cincinnati, Chicago, Pittsburgh, Larimer and Rillton. The town of Rillton is located in Westmoreland County, on the Pennsylvania Railroad. The guests of the company will be transported to the new works on a special train and will there be afforded an opportunity to inspect one of the largest and best equipped establishments of its kind.

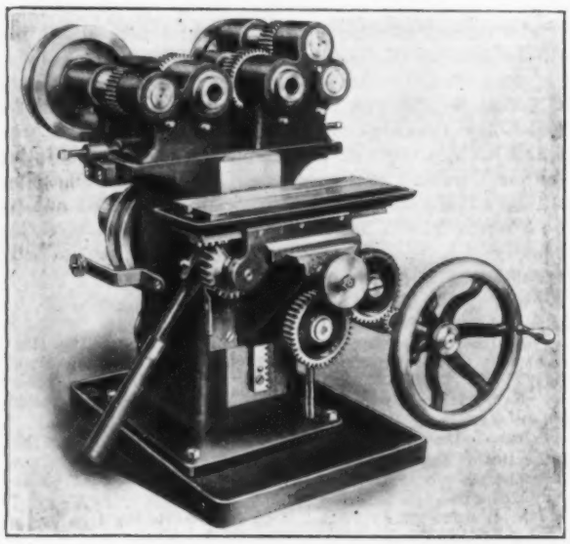
The Youngstown Sheet & Tube Company, Youngstown, Ohio, has placed a contract for the building of a new butt weld pipe furnace, making a total of three furnaces of this kind in its plant.

The Burke Two-Spindle Bench Miller.

The bench milling machine, with two spindles adjustable in their distance from one another, shown in the illustration, is, so far as is known, the first machine of the kind ever built. Originally it was designed for one of the big manufacturers of typewriters for the purpose of milling both ends of type bars at one time, so as to secure perfect alignment at one setting. The usefulness in other lines of a machine with these capabilities has prompted the manufacturer, the Burke Machinery Company, Cleveland, Ohio, to place it regularly on the market.

The spindles rotate in different directions so that the work can be clamped to the table and raised between the cutters, the cutting on each end being done with a downward cut. The adjustment of the heads permits a great variety of work to be handled, not only in the milling of the two ends of a piece simultaneously, but in ordinary surface milling, where substantially the machine will have the capacity of two single millers.

The table of the miller has a longitudinal movement of 6 in., a transverse movement of 2½ in. and a vertical



A Double Spindle Bench Milling Machine Built by the Burke Machinery Company, Cleveland, Ohio.

movement of 5½ in. The working surface of the table is 4 x 12 in. The maximum distance between the bed and the spindles is 6½ in., and the minimum distance 4 in. The largest diameter of the cone driving pulley is 6 in. and the smallest 3½ in. The spindles have holes to take No. 9 B. & S. tapers. The machine stands 25 in. high over all and weighs complete with countershaft about 400 lb.

The driving pulley is on the back of the column and may be partly seen in the illustration. On the same shaft with this pulley is a large flanged pulley, which is connected by a continuous belt to the two spindle driving pulleys. The belt passes successively around one of the spindle driving pulleys, around the main driving pulley, around the second spindle driving pulley and around an idler pulley below the driving pulley back to the first spindle driving pulley. The idler is adjustable to take up the slack of the belt caused by moving the heads. The shafts of the spindle driving pulleys carry gears which drive the spindles, on the left side directly and on the right side through an intermediate gear to give the reverse rotation to that spindle. The gears are of cast iron, the spindles of crucible steel and the bearings of phosphor bronze.

The longitudinal feed, which is used more for positioning the work than anything else, is operated, as shown in the engraving, by a ratchet lever and pinion meshing a rack on the lower side of the table. The feeding movement is usually obtained by lifting the table vertically between the cutters, these cutters being adjustable sideways, as before stated. The table, saddle and knee are raised vertically by the hand wheel shown, which operates through gearing to drive a gear engaging in a rack on the face of the column.

All the spindle bearings are equipped with wick oilers and suitable oil boxes cast beneath the bearings. In case it should be desirable to attach weights to the knee to counterbalance it the small grooved pulleys on the side of the column are provided, over which the cords supporting the weights are hung.

A Proposed Standard Horsepower Rating for Automobiles.

A standard for horsepower rating and alcohol-acetylene as a fuel were the subjects taken up at the April meeting of the mechanical branch of the Association of Licensed Automobile Manufacturers. The need of a universal method for computing horsepower was discussed and suggestions for the adoption of an A. L. A. M. horsepower standard was recommended.

The horsepower of a car under the present ratings may mean anything a salesman may say, as various formulæ for computing these ratings are used, no two giving the same results. After having the advisability of a universal rating under consideration for several months the standards suggested by the branch were to be taken from a brake test at the flywheel, in conjunction with a formula to be suggested by the Test Committee. Two units are to be used, the lower being the actual rating from the brake tests, as computed from an indicator at 1000 ft. per minute piston speed, and the higher number to be the maximum horsepower developed from superior workmanship or the results of a better type motor. For example, in a 20-24-hp. motor the 20 would be the actual horsepower at 1000 ft. per minute piston speed and the 24 the horsepower which would be developed when not under normal conditions. The value of this is readily seen, as it would prevent salesmen or entrants in tests from rating a car at 30 hp. when it would actually develop 60, thereby not only misrepresenting the rating of the car, but taking an advantage of those giving an actual rating.

The discussion of alcohol-acetylene as a fuel developed some interesting matter.* The growing need of a substitute for gasoline was realized, but whether acetylene and alcohol in combination would supplant the present fuel supply, is a problem yet unsolved. Mr. White of Baker & White, exponents of the new fuel, gave a most interesting illustrated talk on the subject. Radical statements were made by him as to the efficiency of the carbide-alcohol mixture. Mr. White predicted that by September 1, alcohol could be obtained at a figure less than 20 cents per gallon, and that in certain places and in quantity, carbide could be purchased for this purpose at 1 cent per pound. He has proved that to get the best results a half pound of carbide should be used to a gallon of alcohol, this making the cost of the new fuel slightly over 20 cents a gallon to the consumer. Every gallon of denatured alcohol contains about 10 per cent. of water which was found did not work as well as alcohol containing 18 or 20 per cent. of water, the addition of this extra water increasing the combustion qualities of the mixture.

As engines are now built for the use of gasoline, it would be much more practical to adapt the fuel to the engine than the engine to the fuel. It seems, however, from experiments now under way, that in a short time gasoline will have one or two very strong competitors as fuel for automobile propulsion.

A business meeting of the branch followed the regular session and three new members were added to the Tire Committee to assist in the furtherance of the standardization of tires it has adopted.

The New York State Steel Company, Buffalo, N. Y., made the first heat of steel in its new Talbot open hearth plant on Thursday, April 19. It is reported that every part of the plant worked smoothly.

* This new fuel has been given the name alkoethine, and under the title "Alkoethine, a Fuel for Gas Engines," was described in *The Iron Age* March 21, 1907.

Locomotive Coaling Plants.

The report of the Committee on Buildings presented at the annual meeting of the American Railway Engineering and Maintenance of Way Association at Chicago, March 19-21, gives interesting data concerning the equipment of locomotive coaling stations. The types of outfit particularly dealt with are the locomotive crane, the clam shell bucket and trolley, the link belt and the Robins belt conveyors. In substance the results presented are as follows:

Comparison of Various Types.

Locomotive Crane Type.—At terminals, where the demands are not too great, coaling can be done by means of a locomotive crane handling the coal direct from flat bottom cars to a locomotive. This crane can also help switch coal cars, if necessary, and can handle cinders and sand. To allow the use of drop bottom cars, a pit can be constructed from which the crane can handle the coal. To avoid delay to locomotives a trestle can be constructed on which the crane can work, so that it can load direct into bins, in which a fair amount of storage room can be provided. The bins are not protected from the weather, and the coal and the gates are liable to be frozen up. With the necessary tracks, the pit and the hoppers, it will be found that this sort of a plant has a considerable first cost. Its cost of operation depends upon the work which can be provided for the crane at spare times. Its value is great in emergency situations and at points where, because of impending changes, the construction of a permanent plant is unwise. With a large terminal, where a conveyor plant is used, a locomotive crane would be very valuable to handle the cinders and sand and also coal during a possible breakdown of the conveyor. The practical limit of a locomotive crane is said to be about 70 engines a day. The fact that it can unload direct from flat bottom cars is much in its favor. Three of these cars, besides handling cinders, show a cost of 13.4 cents per ton for two years operations, coaling direct from cars. The average was 195 tons a day.

Clam Shell Bucket and Trolley.—A special bucket of the clam shell type operated on a trolley can handle coal direct from a pit or from flat bottom cars into bins over the tracks, and can also handle cinders. While this device has not yet been tried for coaling locomotives, it is receiving more or less attention and will undoubtedly be tested soon. The number of tracks it can serve is unlimited, and the mechanism is simple. The horsepower required is small and the first cost is not excessive. This type would be especially valuable where self-clearing cars cannot be regularly obtained and where large storage is desired. It is believed that with a plant of this type coal can be handled at a reasonable cost from flat bottom cars. There should be no difficulty in getting an actual working capacity of 75 tons an hour, which is ordinarily ample.

The Link-Belt Type.—The bucket conveyor or link-belt type requires a small ground space, has great flexibility of adjustment to suit different conditions, and can be used for almost any situation desired. With the softer grades of bituminous coal, such as that from the Indiana field, these plants tend to break up the coal. Many of these plants are in operation, and, where well cared for, they are giving excellent service. The expense of power and repairs are not great, and, where the conditions are such as to recommend their construction, they give good service at a reasonable cost. The average cost at one plant for six months was 11.8 cents a ton, 165 tons a day being handled. Another plant operated for five years showed a cost of 14.3 cents a ton. Three plants on another road handling 147 tons a day each had an average cost for one month of 11.3 cents a ton. Four plants handling an average of 345 tons a day, with about 80 per cent. of self-clearing cars, had a cost of 9.4 cents a ton. A plant built under peculiar conditions and provided with scales, handled 450 tons a day for three months, with an average cost of 18.4 cents a ton.

The Robins Belt Type.—Plants raising the coal on a continuous belt of rubber and cotton on an incline of about 30 degrees are coming into use. The maintenance cost is reasonable, and in most situations it can be as readily fitted in as any other type. In some locations, where plenty of space is available, a better storage yard for coal cars can be provided with this than by any other type, as the receiving hopper can be placed a considerable distance from the storage bins in any direction. There are very few parts of this which can get out of order. The ordinary objection to this type, the expense of belt renewal, is only about 0.2 cent per ton, a comparatively small amount, which makes no appreciable difference in the total cost of maintenance. Four belt conveyor plants operating with 90 per cent. of self-clearing cars show an average cost for 10 months of 9.3 cents a ton, 280 tons being handled a day. A second plant handling 127 tons a day had an average cost of 12.2 cents a ton. A third, handling 218 tons a day had an average cost of 6.9 cents a ton for three months..

In all cases the above costs include the items of interest and depreciation, operation, maintenance and car storage.

General Observations.

For large plants, where coal is delivered in self-clearing cars and an unloading hopper is used, tracks can be so arranged that cars can be handled by gravity without the need of switch engines, decreasing the cost of operation. A locomotive crane as an auxiliary for handling cinders, sand and coal in emergencies is very desirable. Although most roads do not now consider it necessary to weigh the coal accurately as delivered to locomotives, some plants are built with this provision. Storage bins, holding as much as 100 tons, on scales, are used, or else auxiliary bins on scales, with a capacity of 5 or 10 tons, are placed underneath the large storage bins. The use of scales is sometimes avoided with trestle plants providing small auxiliary pockets in which the measuring can be done by volume. The scales add considerably to the cost.

With belt or bucket conveyors the bins should be designed so as to prevent an accumulation of slack. Slack coal in considerable masses, which is not used for a long time, may cause spontaneous combustion. With some grades of coal, where run of mine or lump is used, it is necessary to provide means of breaking it up. Breaker bars can be either placed over the hopper, which will not allow any coal above a certain size to pass without being broken up, or else a crusher can be provided. The breaker bars deliver the coal in better condition, but are more expensive in operation. Where softer grades of coal are used, it is important that the plant be designed to avoid breakage as much as possible.

The handling of sand and cinders is frequently attempted in connection with coaling stations, but, unless separate machinery is provided, they have not generally been successfully operated, due largely to the excessive wear caused by the cinders and sand on the moving parts.

Some efficient method of fire protection is very desirable, many expensive plants having been destroyed by fire.

The recent and prospective increases in the cost of labor and timber and the demand for greater reliability of service tend to increase the desirability of having better coaling plants built of steel or reinforced concrete.

Conclusions.

1. The present records of the cost of operation of coaling plants on nearly all roads are incomplete and of little value for comparison with each other.

2. The cost items should include charges for interest and depreciation, charges for maintenance and operation (the cost of switching cars to trestles should be included) and a charge for the use of cars for storage purposes.

3. Plants must be reliable and not cause unnecessary delay to engines or cars.

4. Provision should be made for fire protection, the avoidance of damage to the coal, and its delivery in the best possible condition.

5. The use of self-clearing cars should be made pos-

sible, and ordinarily it should also be possible to shovel from flat bottomed cars.

6. Storage for emergency purposes and fireproof construction are, in general, to be recommended and in some cases duplicate machinery is desirable.

7. Where self-clearing cars cannot be regularly obtained, either a locomotive crane or a trolley hoist, using a bucket of the clam shell type, is desirable.

8. For a small terminal the two-bucket hoist seems to have good points, where a deep foundation is not too expensive.

9. For larger plants some conveyor type is desirable.

The Mining Engineers.

The first session of the American Institute of Mining Engineers was held at the new house of the Engineering Societies, New York, on Thursday afternoon, April 18, John Hays Hammond being in the chair. Dr. R. W. Raymond, the secretary, explained in detail the relations between the institute as a founder society and the United Engineering Society, the body which has charge of the administration of the Engineering Building. He paid a very glowing tribute to the fidelity and the earnest services of Henry Grant Morse, the son of a former member of the institute, as one of the architects of the building, and during its construction and until recently a member of the firm of Hale & Morse. Mr. Morse had charge of the construction and devoted his entire energies to it, Dr. Raymond declaring that the success in completing the structure in the specified time and within the allotted funds was due principally to the efforts of Mr. Morse. Those who have been closely associated in the work express their thorough approval and appreciation of Dr. Raymond's well merited tribute.

Dr. Raymond also gave some very interesting details on the golden key which had been used in the ceremonies of turning over the building by the Building Committee to the United Engineering Society. Made by the Yale & Towne Mfg. Company the handle bears the insignia of the three founder societies. The gold from which it was made came from the famous North Star mine in Grass Valley, California. On the reverse, under a piece of rock crystal, there are particles of the actual gold, which was taken out of the first pan of gold obtained at Sutter Creek, Cal., on July 19, 1848, by John Marshall, the discoverer of gold in California. He had found a nugget on the preceding day. The gold panned out by Marshall was tested with acid by W. T. Sherman, then a lieutenant at the neighboring fort, and pronounced to be the precious metal. The records were presented establishing fully that the particles in the key are authentic, they having been given by the United States Government to Dr. George F. Kunz of Tiffany & Co. in recognition of personal services rendered.

The professional paper presented before the meeting was that of H. T. Hildage on

Mining Operations in New York and Vicinity,

who refers to the general subject in the following terms:

"Although Greater New York does not bear any resemblance to a great mining district, the mining operations that are being conducted in and about the city are both extensive and interesting in character. With regard to the extent, it may be mentioned that at present there is more dynamite used in New York than in any mining district in the United States; that there are under construction about 38 miles of tunnel, and that 66 miles more are projected, most of which must be constructed in the near future; that since 1902 at least 2,000,000 tons of earth has been removed in underground work, in addition to about 3,500,000 tons that has been removed in open cut in connection with tunnel work, and many times this quantity that has been removed in excavating foundations for buildings not connected with tunnel work; and that there are to-day probably more than 5000 men engaged in mining work in and about New York City. These undertakings include almost every operation connected with underground work, from exploration by means of trench and boring to the sinking of large shafts and the driving of large tunnels through every kind of ground from hard rock to soft, semifluid silt and quicksand."

Mr. Hildage describes more particularly the methods pursued in tunnelling through soft ground, taking up in turn the development at the old Hudson River Tunnel and the Moir and other types of shields.

The second session, on Friday afternoon, was signalized by the reading of a paper by Dr. Henry M. Howe and Bradley Stoughton on the "Influence of the Condition of Casting on Piping and Segregation as Shown by Wax Ingots." It may be described as a companion paper to Dr. Howe's keen and exhaustive paper on

Piping and Segregation in Steel Ingots.

The scope of Mr. Howe's contribution of over 100 pages, which is referred to as "a preliminary paper," and which is divided into three parts, may be judged from the following summary of its contents and its conclusions:

The first part of this paper treats of the causes and the restraining of piping in steel ingots; the second considers the causes and the restraining of segregation; and the third proposes certain precautions in engineering specifications concerning these two defects. Into their causes I have looked carefully, with the purpose of arriving at rational methods of restraining them, and at efficient ways of detecting and measuring the harm which they cause, so as to benefit the public by reducing this harm at once effectively and with the least expense to the manufacturer, and therefore in the end with the least expense to the consumer.

In Part I I infer that the pipe is chiefly due to what I call the virtual expansion of the outer walls of the ingot in the early part of the freezing. I find that the upper and smooth faced part of the pipe probably forms while the interior is still molten, but that the lower, steep, and crystal faced part probably forms in metal which is already firm. Of the five causes which may co-operate to limit the depth of the pipe, I find that three—blow holes, sagging and the progress of freezing from below upwards—are usually effective. I find that the pipe may be lessened by casting in wide ingots; in sand molds, especially if these are preheated (this is rarely expedient;) at the top instead of at the bottom; slowly; and with the large end up; by the use of a sinking head or other means of retarding the cooling of the top; by permitting blow holes to form; and by liquid compression. Most of these I consider in some detail, and in particular I dwell on the advantages of casting with the large end up, and I propose certain administrative arrangements to permit this.

In Part II I find that, although the reasons why casting in wide ingots and in sand or clay lined molds shorten the pipe do not apply to show that they should raise the segregate, yet the position of the segregate should be raised by the six other means by which the pipe is shortened, viz.: by casting at the top, slowly, and with the large end up; by the use of a sinking head or other means of retarding the cooling of the top; by allowing blow holes to form; and by liquid compression.

I next consider the means proposed for lessening the degree of segregation, as distinguished from raising the position of the segregate, viz.:

Quieting the steel by adding aluminum;

Casting in small instead of in large ingots; and hastening the solidification, not only by casting in small ingots, but also

By casting at a low temperature;

By casting in thick walled iron molds (*i. e.*, those of high thermal conductivity); and

By casting slowly.

Pending the completion of further experiments and an analysis of the data, I point out that quieting the steel has materially lessened segregation in certain cases, and I hold that segregation is probably much less in small than in large ingots, but that rapid cooling has certain effects which tend to lessen segregation and others which tend to increase it, so that its net effect should be expected to differ both in importance and in sign from case to case; and I find that the evidence agrees with this inference.

I consider at great length the effectiveness of the different methods of fluid compression, concluding that Whitworth's system should be the least effective, S. T. Williams's the most effective, and the systems of Harmet and Illingworth intermediate in effectiveness in raising the segregate.

In Part III I consider briefly the relations of maker and buyer, the reasons which lead to secrecy in manufacture, and especially the imperfect protection which patents can give to many metallurgical inventions. I then lay stress on inspection at the rolls and shears, and especially on axial drilling of the billets or other products.

The different means of restraining piping and segregation which have here been studied are then recapitulated, and the paper ends with an explanation of why it is that

of these various means, only top casting can well be insisted on in the majority of cases; and why in certain special important cases the buyer may consider carefully whether he may not reasonably insist that casting shall be done with the large end up, with a sinking head or its equivalent, and in ingots not larger than 8 in. square.

The wax ingots, since they notably exaggerate greatly the effects of piping, illustrate admirably the effect of varying conditions of slow and rapid pouring, of hot and cold top, of casting into ingots smaller at the top, &c. Dr. Howe had a series of them on exhibition, and briefly pointed out his observations and touched upon the conclusions which he has drawn from them.

In discussing the paper, Robert W. Hunt of Chicago dwelt upon the effect upon quality which the desire for maximum production has had in the case of steel rails. So revolutionary a proposal as to get rid of piping by a discard up to 25 to 33 per cent. is a remedy not to be thought of in connection with rail manufacture. Yet too much has been sacrificed to speed and to tonnage, and in the interest of quality and with it of safety in traffic, reform in methods is imperative. The desire to obtain large outputs has led to an effort to reduce the number of passes, so that it becomes more and more difficult to force the proper change in the crystallization of the casting, the ingot, to the needed fine grain of the finished rail. As an illustration of the effect of modern methods upon the quality of the rail, Mr. Hunt referred to the fact that during the past two years there has been running again a superannuated rail mill which represents the conditions of working prevalent many years ago. The machinery is weak, so that the process gets back closer to the old methods. There are now in the track about 100,000 tons of rails made in the past two years in this mill. Yet the wear of the rails is better than that of the product of modern mills, and in the absence of rail breakages the record of this mill is four to one in its favor, and that in spite of the fact that from the standpoint of chemical composition it is not nearly so good.

There were then presented papers by Prof. James F. Kemp on "The White Knob Copper Deposits," and by Prof. H. O. Hofman on "Laboratory Experiments in Lime Roasting a Galena Concentrate with Reference to the Savelsberg Process."

J. E. Johnson, Jr., of Glen Wilton, Va., spoke on

The Gayley Process,

in further discussion of the paper by C. A. Meissner, presented at the Bethlehem meeting. Mr. Johnson, who is a believer in the dry air blast, takes issue with Mr. Meissner again on certain points. He states that the experience of the majority of furnacemen, except some of those using Lake Superior ores, is opposed to Mr. Meissner's contention that natural air blast has not shown the increase in output and the decrease in fuel consumption when the air is cold and dry in winter, which was caused by cold dry blast artificially produced. Mr. Johnson cites Mr. Gayley's original patent specification to the effect: "Thus in the summer months, because of the greater content of moisture in the air, 200 lb. more fuel on an average are required to produce a ton of pig iron than in the winter months." Mr. Johnson submits a diagram covering the weekly average of coke consumption and output of a Virginia furnace running for a period of three years on one kind of ore with a uniform blast temperature of 850 degrees and making only basic iron. Mr. Johnson also takes issue again with Mr. Meissner on the argument that the advantage of the dry blast lies principally not in its dryness, but in its uniform density and content of oxygen, in which he was again supported in the discussion by Professor Howe. In conclusion, Mr. Johnson says that "It is probably safe to repeat that the great advantage of the dry blast is its dryness and that that portion of its results which cannot be explained directly on that account alone is completely accounted for by the moral and material secondary advantages which come from it."

Drawback on Firearms.—A series of regulations for the allowance of drawback of duty paid on gun barrels used in the manufacture of firearms intended for export has been promulgated by the Treasury Department upon the application of the Stevens Arms & Tool Company, Chicopee Falls, Mass. The usual drawback of 99 per cent. of the duty paid on the imported barrels will be allowed when the guns are exported, subject to specified requirements regarding entries. In liquidation, the number of imported barrels which may be taken as the basis for the allowance of drawback may equal the number declared in the drawback entry after official verification of exported quantities, provided it shall not exceed two for each gun exported.

The Ingersoll-Rand Company.

In a circular issued by the Ingersoll-Rand Company announcement is made that the directors have decided to issue 3000 shares of new preferred stock. Of this issue the proceeds of 2250 shares will be used in payment for properties to be acquired, and 750 shares will be used in payment for the construction and equipment of extensions to the company's present plants. It is proposed to take over the $100,000 Imperial Pneumatic Tool Company of Athens, Pa., and double its capacity. It also contemplates the acquisition of the largest part of the new issue of stock to be made by the Canadian Rand Company, Limited. The company will also build a foundry and make large extensions to the plant of the Imperial Engine Company at Painted Post, N. Y. The privilege is given to the stockholders to subscribe for new stock at par in the proportion of one share for every 100 shares of the capital stock held by them.

The annual report of the company, which will be presented to its stockholders at the annual meeting this week, gives the income account for the fiscal year ended December 31 last, as follows, compared with the previous year:

	1906.	1905.
Net earnings before depreciation	$1,638,937	$1,019,411
Reserve provided for depreciation	369,708	361,133
Net earnings	$1,269,229	$658,278

The constituent companies were acquired on July 1, 1905. The proportion of net earnings from July 1 to December 31, 1905, divided in the ratio of the sales for the two half years is the only comparison that is to be had with the 1906 figures. It is as follows:

	1906.	1905.
Net earnings	$1,269,229	$389,518
Organization expense written off	.....	27,409
Balance	$1,269,229	$362,109
Interest on bonds	100,000	50,000
Balance for dividends	$1,169,229	$312,109
Dividend, preferred (6 per cent.)	269,901	*134,685
Surplus	$899,328	$177,424
Special reserve, patents and licenses	615,000	.....
Final surplus	$284,328	$177,424
Previous surplus	177,424	.....
P. and L. surplus	$461,752	$177,424

* 3 per cent.

The general balance sheet, as of December 31 last, compares as follows:

Assets.

	1906.	1905.
Real estate, buildings, &c	$5,296,631	$4,955,944
Inventory for companies	178,500	173,250
Materials, &c	4,180,777	3,400,956
Accounts receivable	2,044,622	1,849,333
Bills receivable	56,692	102,396
Marketable stocks and bonds	3,712	4,272
Agents' balances	44,102	55,778
Cash at bank	472,721	394,483
Totals	$12,277,457	$10,936,412

Liabilities.

Preferred stock	$4,500,000	$4,500,000
Common stock	3,000,000	3,000,000
First mortgage gold bonds	2,000,000	2,000,000
Accounts payable	630,752	653,736
Bills payable	450,000	240,000
Interest accrued	50,000	50,000
Preferred dividend, payable January 1, 1907	134,994	134,685
Depreciation fund	434,959	180,567
Patent and license reserve	615,000	.....
Surplus	461,752	177,424
Totals	$12,277,457	$10,936,412

The Armstrong Boring Tool.

A lathe attachment of considerable convenience and practical advantage is the three-bar boring tool manufactured by the Armstrong Bros. Tool Company, 109 North Francisco avenue, Chicago. It consists of a holder of convenient design, which is arranged to take the place of the ordinary lathe tool post, and, as its name indicates, it is equipped with three different sizes of bars. Fig. 1 illustrates the attachment and all of its parts, including the combination wrench, which performs all of the functions involved in setting up or changing the tools. Fig. 2 illustrates the boring tool and holder in use.

The device is made from hard steel throughout and is extremely rigid. The holder has a tee head, which fits in the slot ordinarily occupied by the tool post, and is clamped in position by a nut at the top, which at the same time clamps the bars in place. The center of the holder, or in other words the through bolt, has a hole in it in line with the centers of the lathe through which the largest boring bar may freely pass. The bars can be quickly changed when a different size is needed, so that it is possible for the operator to use the thickest bar available for any particular job, consequently the most efficient speed and feed can be employed. The change involves merely the revolving of the outer part of the holder to bring the desired clamping holes in line with the opening through the center post, and tightening the nut at the top clamps all the parts when they have been adjusted to the position for boring.

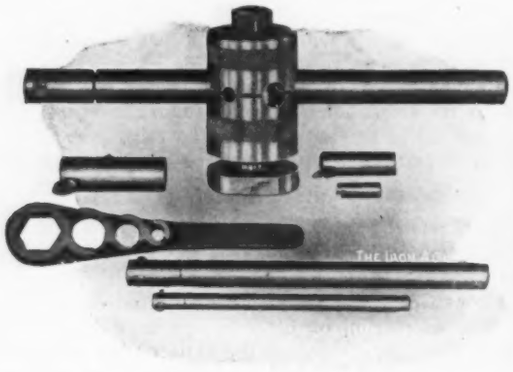


Fig. 1.—The Parts Comprising a Complete Equipment of the Armstrong Three-Bar Boring Tool.

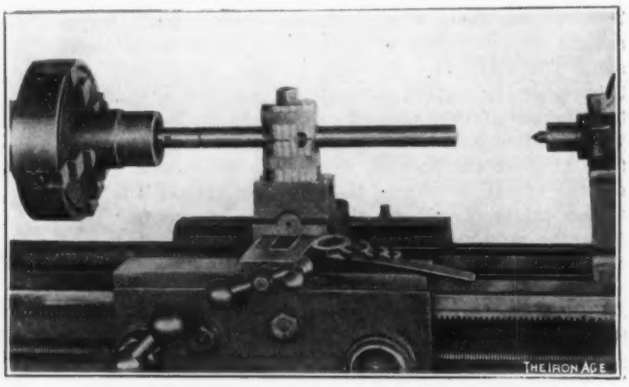


Fig. 2.—The Use in a Lathe of the Three-Bar Boring Tool Made by the Armstrong Bros. Tool Company, Chicago.

The cutter ends of the bars are removable and are threaded with a right hand thread, so that the pressure of the cut only tends to tighten them more securely. The three holes in the wrench below the hexagonal hole for the nut of the tool post are used for tightening the cutters of the three sizes of bars, respectively. It will be observed that either angular or double-ended cutters can be used, the first being convenient in boring and facing recesses and the second in roughing out cored holes.

Each outfit includes the holder, three boring bars with straight and 45-degree end caps and cutters, a piece of each size steel for extra cutters, and the combination wrench. Four sets are manufactured, the first having bars ½, ¾ and 1⅛ in. in size; the second, 9-16, 15-16 and 1 5-16 in.; the third, ¾, 1⅛ and 1½ in., and the fourth, 15-16, 1 5-16 and 1 13-16 in., respectively. On account of the great variation in the hight of centers above the slide rest and the sizes of T-slots in the slides the bolt head and bottom part of the holder are made of sufficient size to allow for the fitting, which is usually necessary.

British manufacturers are agitated by a movement to establish an eight-hour day for miners. The English technical papers now coming to hand contain reports of hearings before the Eight Hours Committee appointed by the House of Commons. The manufacturers of iron and steel are taking a great interest in this matter, as their trade would be seriously affected by any enhancement of the cost of fuel, whether due to natural or to artificial causes.

The Profits in 1906 of Bell Brothers, Limited.

The annual meeting of Bell Brothers, Ltd., was held at Middlesbrough, England, on April 9. Sir Hugh Bell presided, and said the balance sheet showed profits of £140,437, against £87,469 in 1905, and £68,579 in 1904. The company had blown in no furnaces, and had blown out none, but the accidents of weather and so on caused a slightly smaller make of pig iron, the quantity being 349,576 tons, against 352,479 tons in the previous year. Since the company came into existence it had extinguished £57,000 of its debentures. By the time its minerals were exhausted all its obligations would be discharged, but he hoped when that time came the company would still be in a flourishing condition, as the managers were looking for other mineral areas.

The chairman further remarked that the increased profit of the company for 1906 was due to the price of pig iron rising from 46 shillings 11 pence in 1905 to 51 shillings 4 pence in 1906, and from 43 shillings 3 pence in 1904. Continuing, however, he stated that a great deal of additional cost was incurred in the making of the iron, and that cost was not even proportional to the price of the iron. In the year 1899—which was the nearest to be compared with last year—the price was 52 shillings 7 pence. The company then made £213,334, or nearly £73,000 more than in 1906. That led one to compare the elements which go to the making of a ton of pig iron. It was interesting to observe that there had been an increase in the cost of nearly 10 per cent., it having gone up 4 shillings 1½ pence, partly owing to the cost of getting minerals, coal, stores, and other commodities, and partly to the cost of labor.

The Cleveland Manufacturers' Club.

The Cleveland Manufacturers' Club, which was recently formed by manufacturers having plants in the northeastern part of the city, has purchased a club house at 1420 East Fortieth street and will open permanent quarters about May 1. The club already has 50 members and others are joining rapidly. It was planned to limit the membership to 100, but this number will probably be increased. At the time of the organization it was decided to have 50 factories as active members and an associate membership limited to 50 per cent. of the active membership.

In addition to working for the betterment of manufacturing conditions in that section of the city the club will be a social organization, and will have rooms where the members can meet daily for luncheon. At present only the lower floor of the club house will be occupied. It contains four rooms, which will be used as lounging, smoking and dining rooms and a kitchen. Owing to the inadequate restaurant facilities in the vicinity, the club members expect that their rooms will become a popular meeting place at the noon hour. The club house will be given a formal opening as soon as the rooms are fitted up, and an invitation will be extended to all manufacturers to be present.

The Renewal of the German Steel Syndicate.

The following article, which is taken from the London *Iron and Coal Trades' Review* of April 12, throws much light on the German situation:

The renewal of the German Steel Syndicate is by no means an accomplished fact by reason of the provisional agreement which has now been arrived at between a committee of the syndicate and the Westphalian Steel Works Company, and which is expected to receive the confirmation of a general meeting of the combination. As compared with a demand for an allotment of 235,000 tons of steel per annum, a compromise has been arranged under which the company accepts an initial apportionment of 160,000 tons, which is to be increased to 165,000 tons in 1908-1909, and to 170,000 tons in 1909-10. The primary allotment comprises 70,000 tons of the A group of products (semifinished, railroad material and shapes), and 90,000 tons of the B group, as represented by bars, rods, plates, tubes, &c., while the additional quantity of 5000 tons in each of the two years mentioned relates solely to the second group of manufactures.

A Complication with Merchants.

The most formidable obstacle to the prolongation of the syndicate would now appear to be the question as to the relations between certain constituents and their associated firms of merchants, who may be termed works' merchants. In order to understand the situation it is necessary to explain that when the syndicate was in process of formation it was known that three works—Wendel, Rochling and Rombach—maintained intimate relations with firms of merchants, and these works were under the impression that the interests of these business associates would be prejudicially affected by the syndicate. As a consequence, they secured guarantees that their associated firms should continue to participate in deliveries to the extent of the business which they had undertaken down to that time. The guarantees naturally relate to one or more classes of the A group of products, seeing that no such concessions were necessary in respect of the second group of manufactures, which are not sold by the syndicate, but either by any of the works themselves or through merchants. The position thus obtained for the three works was therefore a preferential one, and the business between them and their associated merchants is beyond the knowledge and control of the syndicate.

The advantages derived from such a connection with the merchant trade have commended themselves to other works, and the result is to be found in demands by several other constituents of the Steel Syndicate for the granting of similar privileges. But a warning note was struck at the recent meeting of the Ilsede Works, when the chairman declared that the company only ought to join a syndicate which controlled the whole of the sales This observation has attracted much attention. It appears that the Dudelingen Works have asked for Hirsch & Co. of Frankfort, and the Kneuttingen Works and the Haspe Works for Klockner & Co. of Duisburg, the granting of similar advantages to those mentioned, on the ground that their relations with them are identical with those maintained by the original trio of works with their merchant firms. The claim put forward specially refers to the trade in beams, and a considerable tonnage is demanded for these merchants, as otherwise the two works are unwilling to become members of the new syndicate. The preferential position is also sought for by the Gewerkschaft Deutscher Kaiser for Thyssen & Co., and by the Friedenshutte for another firm, so that the whole question has become complicated, and is aggravated by the opposition which other constituents of the Steel Syndicate are bringing to bear against any extension of such concessions.

The Question of Syndication Thus Threatened.

The problem of works' merchant firms has raised the whole question of syndication. When syndicates were first created they were not constituted in the binding form which obtains at the present time. The arrangements were mainly price conventions, under which the members undertook not to sell below a certain price. But these conventions did not answer the purpose in view, as they were largely only maintained so long as they suited the constituents. If the prices arranged for were nominally adhered to, there were other ways of evading them, either by the granting of rebates or by reducing to a corresponding degree the prices of other products which were sold with them at the same time. The result was a change over to a syndication, which purchases from its members and sells to merchants and consumers. In this way it is possible to exercise complete control. It is contended that this system is being broken by the method of works' merchant firms, and the apprehension is entertained that in the disposal of the B group of manufactures it is possible for the merchants to confer advantages on their associated works in the matter of A products, and of shapes in particular. Although the activity of these firms has, so far, not given any occasion for special complaints, it is submitted that any extension of the system would be dangerous to the other works.

An Adjustment Looked For, in Spite of Obstacles.

A solution of the problem has been suggested in the sense that the difficulty might be overcome by all constituents of the syndicate being allowed the uniform right of themselves disposing of a portion of their production of shapes, in the sense of nominating merchants to whom the syndicate must deliver this particular quantity. It is, however, contended that the adoption of this plan would not remedy the evil, but that it would render it of a general character. The syndicate would more or less lose complete control over this portion of the production, and it would mean a gradual reversion to the former system of loose syndicates as compared with the firm binding combinations of to-day. It is also submitted that an extension of the method of works' merchant firms would be a material retrograde step, which would not be followed by many works, and that, if merchant interests are to preponderate, a syndicate is entirely out of the question. On the other hand, it is apparent that if the syndicate is to be renewed it would be absolutely necessary to settle the differences in regard to the association of works with firms of merchants.

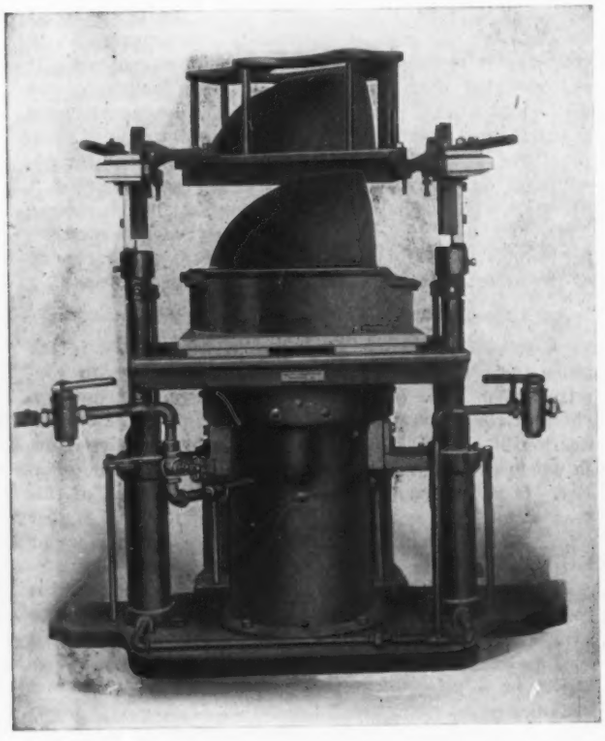
As it is improbable that the three original works' merchant combinations will consent to the relinquishment of their privileges, it will be essential to accord a position of preference uniformly to all the constituents if an agreement is to be reached. If this is adopted in principle, the whole question of allotments will come forward for consideration, for, in addition to the appointments already existing, a second list of allotments will be needed for allocating to the merchants the tonnage to which the works may contend they are entitled on behalf of their business friends. The situation, taken as a whole, is exceedingly complicated, and the prospect of an understanding by the end of this month, when the present syndicate agreement will expire, is not very favorable, although the Germans have a habit of clinching matters just as the clock strikes the final hour of the last day. The advantages of the syndicate to German trade have been so obvious that we anticipate that, in the end, matters will be adjusted.

The Union Switch & Signal Company, Pittsburgh, has received the largest contract ever placed for switch and signal equipment. The order was secured from the Pennsylvania Railroad for the switches and signals to protect the terminal in New York, now in course of construction, and the approaches to the terminal from Newark to Long Island City.

The production of pig iron in Germany and Luxemburg in February, 1907, was 978,191 metric tons, as compared with 1,062,152 tons in January. In February, 1906, the output was 938,434 tons. For the first two months of this year the output was 2,040,343 tons, as against 1,956,895 tons in the corresponding months of last year.

The Herman Jarring Molding Machine.

The name given the machine shown in the illustration, the Herman jarring molding machine, describes in brief the manner in which the sand is packed about the pattern; that is, by jarring the flask. In connection with the machine illustrated, which is manufactured by the Herman Pneumatic Machine Company, Zelienople, Pa., there is shown an improved form of turnover for revolving the flask before the drawing of the pattern.



The Jarring Molding Machine with Improved Turnover, Built by the Herman Pneumatic Machine Company, Zelienople, Pa.

The pattern is fastened in the frame shown at the top of the machine, which is suspended by trunnions, allowing it to be revolved. At the beginning of operations this turnover, as it is called, is placed in inverted position to that illustrated, and rests upon the table plate. The pattern is then fastened to the turnover and the flask is placed over it and filled with sand. By opening an air valve the jarring device is set in action and the mold receives from 10 to 50 jars, or as many as may be necessary to sufficiently pack the sand. This manner of ramming is claimed to have the advantage of almost certainly precluding swells and scabs. The sand is jarred uniformly and is packed most densely around the pattern, while the top is less compressed and being therefore more porous, allows easy escape of the gases. After the ramming is completed the sand is struck off and the follow board is clamped to the flask. Pneumatic lifters are then operated, which raise the turnover plate high enough to allow it to be revolved, when it is again lowered on the table plate of the machine. The clamps are then removed, lifting forks are placed under the turnover plate, and through the pneumatic hoists which are attached to the side of the machine the pattern is drawn from the sand. The mold is then ready to be placed on the floor. To repeat the operation the lifting forks are disengaged, the pattern is turned over to its former position and the air is released, allowing the turnover plate to descend to the table ready to receive the next flask. The turnover device can, when desired, be easily removed and patterns with stripping plates can be used on the same machine.

The machine is claimed to ram up an average mold in less than 1 min. and to give duplicate castings which will vary in weight much less than if they were made in flasks rammed by hand. The time required to place the sand in the flask and remove the flask to the floor depends upon the facilities afforded by the equipment installed and upon the energy and to a less extent the skill, of the man operating the machine.

The Weston Electroplaters' Voltmeter.

For measuring the potential of the current used in electroplating, electrotyping and similar electrometallurgical work the Weston Electrical Instrument Company, Waverly Park, Newark, N. J., has a special voltmeter known as model 131. The instrument itself is an accurately calibrated low range voltmeter contained in an air tight, waterproof case to protect its mechanism from corrosive fumes and deteriorating influences that are likely to exist in the workroom. The special feature is the mounting of the meter on a small wooden switchboard, affording instant connection of the instrument to any one of up to 14 separate tanks the voltage of which it is desired to observe.

The economy of this arrangement is apparent, as one instrument is made to do a manifold duty, and where before a number of even low priced instruments represented a prohibitive cost, one thoroughly reliable one does not entail an expense that is not more than offset by the advantage of an improved quality and quantity of output. Where the voltage is guessed at the flow of current is of course uncertain, and too much results in burned work, while too little results in a thin deposit likely to come off under the buffing wheel and necessitate replating. Under such conditions the chances are not in favor of the operating of the plant at its maximum efficiency. Either too much time is likely to be consumed in plating or the deposit will be above or below the desired thickness and not uniform on various classes of work. On the other hand, by the assistance of a voltmeter the amount of current used is not a matter of conjecture, and it becomes possible to operate any bath at its maximum efficiency.

The switchboard is permanently connected with the tanks, one binding post being connected to the positive side of the plating generator or line, and the remainder each connected by one wire to the negative side of each of the tanks. After the connections are made the voltmeter is thrown in circuit with any tank by turning the switch handle to the numbered point corresponding to that tank. Since each binding post is entirely independent, any number of tanks less than the total maximum of 14 may be connected in circuit. It is assumed that 14 will be the greatest number that it will be desirable to operate from one point; hence the selection of the arbitrary number of 14 points on the switch.

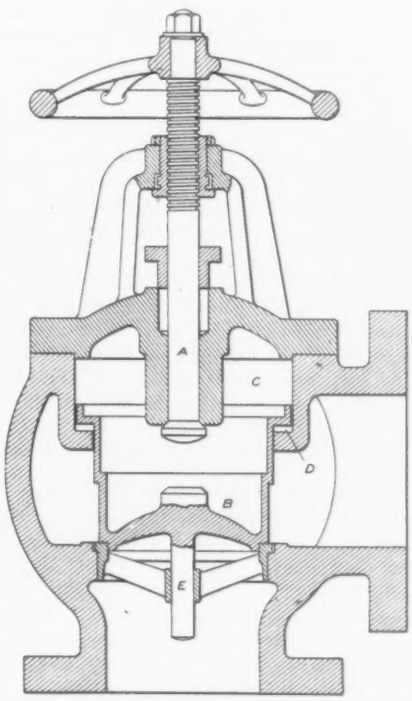
The Weston Electroplaters' Voltmeter.

The General Fireproofing Company, Youngstown, Ohio, has secured a contract for adjustable sliding shelves, two-story stacks, glass floors, stairway and ornamental grill work in a new library building to be erected at Des Moines, Iowa.

The United States Court for the Middle District of Pennsylvania has fixed May 7 as the time for the meeting of the creditors of the Wolf Company, in Chambersburg, Pa.

The Anderson Cushioned Type B Nonreturn Valve.

What are claimed to be the heaviest nonreturn valves made are the Anderson cushioned type B nonreturn "Life and Property Insurance" valves, manufactured by the Golden-Anderson Valve Specialty Company, Pittsburgh, Pa. The form of the construction, shown in the illustration, and the materials of construction are chosen



The Anderson Type B Cushioned Nonreturn Life and Property Insurance Valve Manufactured by the Golden-Anderson Valve Specialty Company, Pittsburgh, Pa.

to adapt the valve to the highest steam pressures in commercial use, and render them free from chatter, hammer or tendency to stick, and to make them positive in case of accident.

These valves when placed between the boiler and header will equalize the pressure between the different units of a battery of boilers, as they remain closed as long as the pressure in the boiler is lower than that in the header. When the two pressures are equal the valves will open and remain so without chattering or hammering. They will automatically cut off a boiler in case of accident to that boiler, such as the bursting or collapsing of a tube, and will also act as a safety stop to prevent steam being turned into a cold boiler, which also means a safeguard for men working inside. It is worthy of note that more lives are lost owing to what may be termed minor accidents than result from actual boiler explosions. A large part of such accidents result directly from scalding, owing to the escape of steam and water, which makes it difficult, in many cases impossible, to approach the stop valve. For this reason it is desirable to take all possible precaution to insure safety. Boiler attendants are many times deceived by inaccurate steam gauges, and are likely to turn on steam and connect the boiler when there is a considerable difference in pressure. Many accidents have resulted from this cause.

As a protection against such accidents the Anderson cushioned nonreturn valve is offered. It is an automatic stop valve and a hand stop valve at the same time, so that it may be used instead of the regular angle, globe or gate valves at the boilers. Very often these can be substituted without changing the piping at the boilers.

Referring to the sectional view, the interior arrangement for cushioning the valve to avoid chattering, hammering and sticking will be understood. The piston or valve is one bronze casting, which may be likened to a Corliss dash-pot. It occupies the full area of the upper portion of the body, thus insuring a perfect cushioning in the opening and closing of the valve, and the perfect alignment of the valve with the seat at all times, irrespective of the position. When the steam pressure raises the valve the large dash-pot above the valve acts as a cushion, and the steam being always under the valve wing at D, cushions the valve when closing. The two actions prevent chattering. The extension at the bottom of the valve acts as the first cut-off or throttle against the effects of the wire drawing of the steam.

The U. S. Electric Bench Drill.

The tool illustrated herewith and manufactured by the United States Electrical Tool Company, Cincinnati, Ohio, is a portable electrically driven sensitive bench drill. It is operated by direct current, which may be obtained through an attaching plug from an ordinary electric light socket. It is capable of drilling holes up to ½ in. in diameter in metal. The friction disk drive is arranged to compensate for wear automatically, the motor being pivotally suspended with a spring between the rear end of its frame and a bracket on the drill press frame. The speed can be changed by moving the friction driving wheel axially, the range of variation being from 390 to 950 rev. per min. The total hight of the drill is 32 in. and weight complete 112 lb. The diameter of the table is 12 in. and the travel of the spindle 6 in. The spindle has a vertical movement of 10½ in., that being the maximum distance from the table to the lower end of the

A Portable Electric Bench Drill Made by the United States Electrical Tool Company, Cincinnati, Ohio.

spindle. This tool is especially adapted for small work, can be easily carried around the shop and is always ready for operation.

In his address as president of the National Cotton Manufacturers' Association, before the meeting in Boston, James R. MacColl of Providence, R. I., says: "The delay in transit to the mills is excessive. An average of two or three months is required to bring cotton from the South to New England mills. In some instances railroads have issued bills of lading on presentation of compress receipts without the cotton being actually in their possession. A prominent English spinner informs me that bills of lading have been received in England for cotton shipped in a specified steamer, and, on being traced, the cotton was found months after at interior towns in Texas. Such a system is fraudulent, and should be stopped by an appeal to the Interstate Commerce Commission or by action in the Federal courts."

The Rapid Determination of Nickel in Steel.

BY DR. GEORGE T. DOUGHERTY, CHICAGO, ILL.

For the past 10 years the quickest standard method generally used, at least in the United States, for the determination of nickel in steel has been by making as a preliminary step a separation of the mass of the iron from nickel by means of ether and then repeating the process. This method was probably first described by G. H. Chase of Philadelphia, and was a distinct advance toward simplified and rapid nickel analysis. What small quantity of iron remains along with the nickel after the two ether treatments is finally removed by ammonia, and a great many chemists make a second precipitation of this iron with ammonia to make sure that all the nickel is saved for a determination. These many operations with repetitions necessarily take a good deal of the busy analyst's time. It seems to be the fashion with many to prolong the work by evaporating to dryness the preliminary solution of the sample and to take up and filter off the silica, when all this is unnecessary and superfluous, especially when nickel in solution is to be finally titrated with potassium cyanide solution.

The separation with ether cannot very well be applied to the analysis of ores of the kinds usually carrying nickel, owing to the presence of sulphuric acid, which has displaced the other acids used in decomposing the ore at the start. The standard method for ores, therefore, is to make two precipitations with ammonia and one basic acetate precipitation. Basic acetate separations are usually tedious affairs, and with many persons rather difficult and not uniformly successful, besides imposing an unwieldly quantity of liquid on the operator's hands to filter and handle.

The Use of Ammonia.

The ether method for nickel in steel, when all essential details are properly and carefully attended to, makes for highly accurate results. However, not being quite satisfied with it on account of the time required I began experiments under different conditions with ammonia and ammonium chloride for separating nickel from iron. These required many months' time to go thoroughly into the subject. Many chemists of repute one after another tried the ammonia treatment and were disgusted with the results, which would show only 20 to 70 per cent. of the quantity of the nickel known to be present. One writer of international note says that it takes at least six precipitations with ammonia to get out all the nickel. They always ascribed their failures to the absorption of nickel by the ferric hydrate precipitate. It occurred to me that perhaps they had not used quite enough ammonia or ammonium chloride or both.

To start the experiments I had nickel steels of known nickel contents, which I had determined carefully by using the standard ether method and finally titrating with potassium cyanide solution. The idea was to try with successively larger quantities of hydrochloric acid subsequently neutralized by ammonia to form ammonium chloride and different quantities of free ammonia in excess after neutralization. For example, I began with 15 c. cm. of hydrochloric acid added to the solution of 1 g. of nickel steel solution in one test; 25 c. cm. in the next; 50, 75 and finally 100 c. cm. hydrochloric acid, and tested the filtrate each time by titrating with potassium cyanide, running all tests in duplicate or more. In view of the numberless failures reported with ammonia and ammonium chloride for a complete separation of nickel all I could hope for was to find a minimum quantity of ammonium chloride and ammonia which will separate the largest per cent. of nickel present, and under similar conditions will yield a fairly constant percentage of this element present. On the basis of the average results thus obtained I could build up a proper correction to be added to the actual figures obtained in analysis and thus approximate the true result as closely as possible. It was therefore an agreeable surprise when I finally discovered that 100 c. cm. strong hydrochloric acid (plus 10 c. cm. acid used in dissolving the steel), subsequently neutralized with ammonia (or its equivalent, 75 g. of ammonium chloride) and 50 c. cm. free ammonia added in excess after carefully neutralizing the solution will make a perfect and complete single separation, leaving no trace of nickel in the ferric hydrate precipitate. To save the time and labor of washing the bulky iron precipitate the liquid, after precipitating with ammonia, is diluted to 500 c. cm. and filtered on a large dry filter, and 250 c. cm. of filtrate is taken for titration. These remarks have reference to 1 g. of steel weighed off for analyses—that is, 75 g. of ammonium chloride or its equivalent of hydrochloric acid and ammonia will separate 100 per cent. of the nickel present from 1 g. of steel, and the same proportion of ammonium chloride and ammonia will probably hold good whether for ½ g. or for 2 g. of steel, though if 2 g. of steel were attempted it would become a white elephant on one's hands on account of the double quantities of chemicals, &c., required. Then the 500-c.cm. volumetric flask would not be large enough to hold all, and a 1000-c.-cm. flask and a larger filter and funnel would have to be used. One gram of steel is amply sufficient for accurate close results by the new method, though 2 g. usually are taken when the ether method is used.

The capacity of the new method is considerably above that of the standard ether method. By the former one can make two or three determinations in the time required for one by the older method. The details of the new method as finally adopted by myself are as follows:

The New Method in Detail.

Dissolve 1 g. of steel drillings in 15 c. cm. nitric acid, specific gravity, 1.20, in a small beaker, and boil 1 min. Have ready and hot 270 c. cm. ammonium chloride solution containing 75 g. in a 500 c. cm. common thin glass flask. Pour the steel solution into this flask, adding rinsings from the beaker. Add hydrochloric acid if necessary to clear up, and then ammonia, little by little, until the solution, though practically clear, is so dark from the dissolved ferric hydrate that you cannot quite see through the body of liquid in the flask when you hold it in front of you before the window, the top part being rather more transparent. (This neutralization is the critical point of the process. A little under neutralizing or over neutralizing is apt to cause lower results.) Cool the flask and contents quickly by running against the glass cold water from the faucet or standing in a vessel. Transfer the contents of this flask with a little rinsing into a 500-c.cm. volumetric flask; add all at once 50 c. cm. ammonia, specific gravity, 0.90; whirl and fill up with water to the mark. Shake vigorously to mix thoroughly, and pour through a 10-in. filter in a 4-in. ribbed funnel into a clean, dry 600-c.-cm. flask. Take 250 c. cm. of filtrate—½ g. of sample; transfer it to a No. 4 Griffin beaker. Throw in it a bit of litmus paper and add sufficient hydrochloric acid (it will take about 25 c. cm.) to acidify the liquid when litmus paper has turned from blue to red; add ammonia cautiously, about ½ to 1 c. cm. at a time, stirring with the glass rod until the litmus paper becomes blue again. Take out the litmus paper and rinse it slightly and throw it away. Not more than 1 c. cm. ammonia in excess is allowable. It is not desirable to allow the litmus paper to remain in the liquid, for when disintegrated by continuous stirring during the subsequent titration its scattered fibers often obscure and render a little uncertain the end point of the titration. Cool by standing in a large vessel of cold water. When cool add 5 c. cm. of silver nitrate solution (0.10 g. in 200 c. cm. water, and then 5 c. cm. of a 2 per cent. solution of potassium iodide). Stir and titrate with standard potassium cyanide solution until the very last drop dissipates and destroys the white opacity of the liquid, making it perfectly clear. One can best avoid overtitrating by sitting down and looking horizontally on the body of liquid in the beaker while titrating and stirring. Deduct 0.2 c. cm. from the burette reading and multiply by 2 and by the titer or nickel factor of the cyanide solution.

If dry ammonium chloride is not in stock it can easily be made up by pouring into a 500-c.-cm. common

thin glass flask, wiped dry on the inside, 80 c. cm. water and 100 c. cm. strong hydrochloric acid, and with caution and frequent shaking 100 c. cm. strong ammonia, slanting the flask during the addition. This mixing of hydrochloric acid and ammonia causes a sudden and high rise of temperature (up to 90 or 95 degrees C., nearly boiling hot), and must not be done in volumetric flasks of the usual thick glass, which is not well calculated to withstand extreme changes of temperature and quick cooling under the faucet without liability to crack.

If no particular accuracy of results is required this method may be considerably quickened by having the cold ammonium chloride solution in the 500-c.-cm. volumetric flask when the solution of steel is added to it, and the whole neutralized and precipitated with 50 c. cm. ammonia and diluted to the mark, or the neutralizing is omitted and 55 c. cm. ammonia at once added to the acid mixture of steel solution and cold ammonium chloride solution. In either modification of the method (neutralizing cold and no neutralizing attempted) the results are a little irregular and low, falling sometimes as much as 10 points under the truth—for example, 3.58 per cent. on a 3.68 per cent. nickel steel. Scarcely any better results can be obtained by neutralizing hot and at once precipitating and filtering while yet hot and taking 250 c. cm. of the filtrate after heated back to the same temperature as the 500 c. cm. liquid had shown on the thermometer at the time of filtering. Only by neutralizing hot and cooling the neutralized liquid before precipitating and filtering will the results be uniformly close and fully up to the truth.

Method for Cupriferous Nickel Steel.

A large majority of pig irons and steels produced in the United States are practically free of copper. The main source of copper steels in circulation is Cornwall ores in the Lebanon, Pa., District, which yield pig irons running 0.75 to 1.25 per cent. of copper. Copper, like nickel, reacts with potassium cyanide, and therefore if both copper and nickel are present in a steel copper must be previously removed or allowed for. If we do not know beforehand the exact per cent. of copper present and must separate it from nickel we will start by treating 1 g. of steel with 20 c. cm. hydrochloric acid, 1.10 specific gravity. When action ceases flocks of insoluble carbide of nickel will be seen floating in the solution. Add 2½ c. cm. nitric acid, specific gravity 1.20, and boil 1 min. to decompose nickel carbide and oxidize the iron. Proceed further, as described in the above method for copper-free nickel steel to the point of filtering after precipitating with ammonia and diluting to 500 c. cm. If copper is absent or is present only in small quantity the ammoniacal filtrate will be very faintly bluish or greenish from the presence of nickel, but if 1 per cent. of copper is present in the sample the ammoniacal filtrate will be pretty plainly blue. One per cent. of copper makes a far stronger blue color with ammonia than 3½ per cent. of nickel does. Now take 250 c. cm. of the filtrate; add 25 c. cm. hydrochloric or just enough to acidify it, and then 14 c. cm. more, so that the liquid will contain 5 per cent. of free hydrochloric acid, and then be sufficiently acid when sulphuretted hydrogen gas is subsequently passed into it to precipitate copper free of any nickel. An apparently trifling precipitate of copper sulphide may amount to notable figures and, therefore, must be filtered off and washed with water containing some sulphuretted hydrogen. The filtrate is next boiled and oxidized if necessary with a little potassium chlorate to clear up. Add ammonia to neutralize, not over 1 c. cm. in excess. Cool and titrate.

Solutions Required.

Ammonium Chloride Solution.—Use 555 g. of the salt in 2 liters of water. If there is any sediment, filter. The salt dissolves readily without any application of heat if the bottle is shaken vigorously. It is often more convenient to make it up by mixing hydrochloric acid and ammonia, as described elsewhere in this article. Of ammonium chloride solution 270 c. cm. is needed for each analysis, taking 1 g. of steel.

Standard Nickel Solution.—Dissolve 2.0040 g. of Merck's "highest purity" nickel in nitric acid and dilute to 2 liters. Each cubic centimeter equals 0.001 g. nickel. In lieu of Merck's nickel Orford Copper Company's commercial nickel may be used, on the basis of being 99 to 99½ per cent., say 99.25 per cent.

Standard Potassium Cyanide Solution.—Use 24 g. in 2 liters. It changes slowly and appreciably, and must be restandardized every two or three days for particular work. For standardization: Take 50 c. cm. of the standard nickel solution (equals 0.050 g. nickel) with a pipette; let it run into a No. 4 Griffin beaker; add 100 c. cm. water, 50 to 80 c. cm. hydrochloric acid; throw a bit of litmus paper; add nearly as much ammonia as you have added hydrochloric acid and then more, until the litmus paper has turned blue; add a little hydrochloric acid to acidify, and again, but very cautiously, ammonia, ½ to 1 c. cm. at a time, until the color of the solution has become bluish or the litmus paper has turned blue, not over 1 c. cm. in excess. Throw out the litmus paper after rinsing it slightly. Cool. Add 5 c. cm. of silver nitrate solution and 5 c. cm. of potassium iodide solution, whereupon a white opacity or cloudiness will develop in the liquid. Run the potassium cyanide in from a burette and toward the end move cautiously, one drop at a time, with good stirring until the very last drop suddenly clears up the whole liquid. Deduct 0.2 c. cm. from the burette reading for a blank correction, and by the remainder divide 0.050 g. nickel. One cubic centimeter of the freshly made potassium cyanide solution is equivalent to about 0.002500 g. nickel.

The Helen Mine of the Lake Superior Corporation.

In *The Iron Age* of March 14 were printed some extracts from the report of the Ontario Bureau of Mines for 1906. A complete copy of the report has since been received and from it the following statement regarding the Helen mine of the Lake Superior Corporation is taken:

At the beginning of work on the mine Lake Boyer occupied the basin west of the ore deposit, hiding everything below its surface. This pond has been pumped out and the whole basin, except a remnant still covered with water, is now open to study. . . . The workings are 280 to 300 ft. below the original level of Boyer Lake and the ore body does not seem to narrow downward, but tends to dip a little eastward, as if passing under the siderite hill. The quality of the ore remains about the same, running from 55.15 to 60.56 per cent. of iron, 0.09 of sulphur and 4.32 of water. About 1,500,000 tons of ore have been mined in all, and perhaps as large an amount of similar ore remains in the mine, but the increasing number of sheets or masses of pyrite make the mining more difficult. The diamond drill shows that good ore extends 165 ft. below the second level, which is 180 ft. below the original surface of Lake Boyer.

The system of mining used in getting out the ore is similar to the "room and pillar" method in coal mining. The main drift is driven down the whole length of the ore body, which is about 500 ft., and drifts are run from this main drift at right angles to it. Raises are made from these cross drifts for man holes, and the ore is stoped from the chambers by overhand stoping. The method is analogous to the methods of mining used in the iron mines of Minnesota. The stopes are not more than 60 ft. high, and are all worked out on the south side of the main drift on the second level. There are two kinds of ore in the mine, namely, red hematite and brown hematite, the former being higher in iron and the latter in moisture; in fact, the latter approaches very closely to a limonite. The brown ore comes mostly from the east end of the pit and the red from the west end. A body of pyrite running 50 per cent, sulphur occurs on the northeast side of the deposit. This pyrite is in a fine granular condition, but is not being taken out at present. The ore does not increase appreciably in sulphur until within a few feet of the deposit of pyrites. The ore is dumped direct from the skip into an Austin crusher of 2500 tons capacity crushing to 6 in. All work in the mine is done by contract. The machine men get so much per ton of ore broken, and the laborers and trammers so much per car. There are 12 machine drills running on each shift.

At the Josephine mine during the summer of 1905 some diamond drilling was done, but there has been no mining since the close down in 1903.

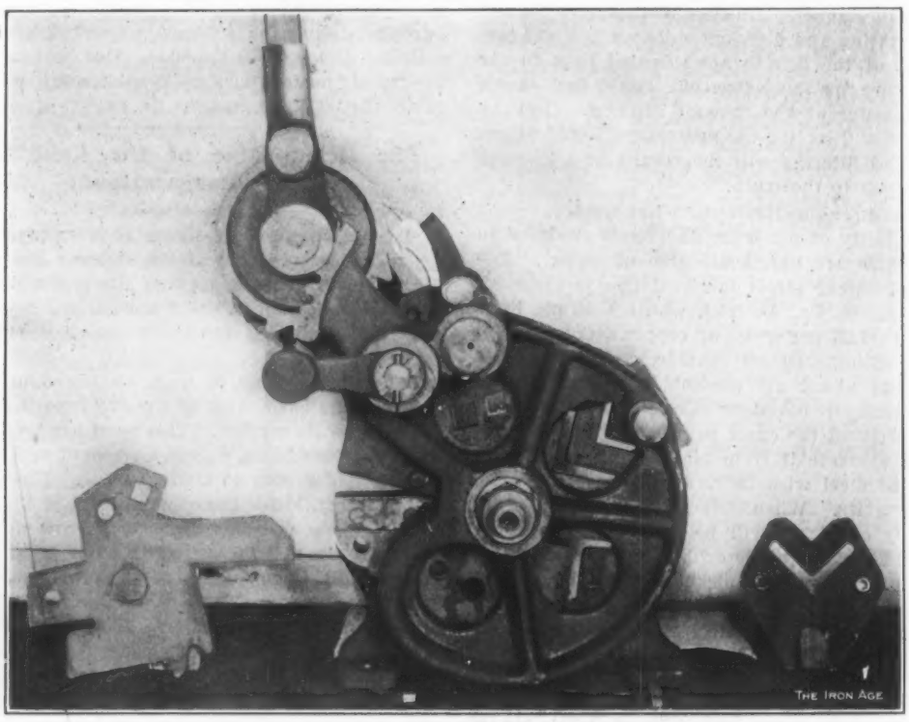
The Niagara Universal Hand Power Shear.

A combination machine for cutting angle and tee iron, and round, square and flat bars, which is a new product of the Niagara Machine & Tool Works, Buffalo, N. Y., is shown in the accompanying illustration. The construction is exceedingly simple. The frame consists of two parts made from steel castings in which are inserted dies of tool steel corresponding to the different shapes of stock which may be cut. The two parts are clamped face to face at the center, one part being stationary while the other is capable of a limited rotary movement around the center pivot.

The machine is at all times ready for cutting any of the shapes previously mentioned without requiring any special setting of the dies. The angle iron cutters are adapted to take 2½ x ⅜ in. and 2 x ¼ in. stock. They are removable to permit of substituting others for smaller angles, as the cleanest cut is obtained when the work is approximately the same size as the dies. The other cutters which provide for 2½ x ⅜ in. tee iron, 1-in and ¾-in. round bars and 1-in. and ¾-in. square bars are not removable. The straight knives permit of cutting flat bars up to 4½ x ⅝ in. Hold down plates are fastened to the side of the machine to hold and guide the stock while it is being cut off.

The rotary motion of the dies, it is maintained, insures a cleaner cut than can be obtained by an up and down motion. The machine has a compound mechanism for giving a powerful leverage when the heavier work is being handled, and can be operated direct with greater speed when cutting lighter stock. The lighter leverage is obtained when the pin near the pivot of the operating handle connects it with the wheel having ratchet teeth on part of its circumference. This wheel is on a shaft having gear teeth at its opposite end which engage with rack teeth on a projection from the stationary member of the frame. Bearing down on the handle causes the rotary part to revolve downward by the purchase obtained through the gear teeth on the stationary member.

For the more powerful compound movement the pin is withdrawn from the operating handle so that the gear teeth on the hub of the handle engage the segment gear, shown in the illustration, rocking this in a direction to cause the smaller of the two pawls to revolve the ratchet wheel one tooth at a time, while the longer pawl holds it against retraction until a new tooth is engaged by the small pawl. The small weight shown is on the shaft with the small pawl and serves to keep engaged with the ratchet teeth on the working strokes of the hand lever.



A Universal Bar and Angle Shear Built by the Niagara Machine & Tool Works, Buffalo, N. Y.

The Dedication of the Engineering Building.

The second day of the exercises connected with the dedication of the Engineering Building given by Andrew Carnegie was designated as Founder's Day, J. W. Lieb, Jr., general manager of the New York Edison Company, presiding as chairman of the Executive Committee formed to conduct the festivities. There were addresses by the presidents of the three founder societies—Dr. Samuel Sheldon, president of the American Institute of Electrical Engineers; Dr. F. R. Hutton, president of the American Society of Mechanical Engineers, and John Hays Hammond, president of the American Institute of Mining Engineers. T. C. Martin, as president of the Engineers' Club, voiced the welcome of that social institution which was associated with the Engineering Building in Mr. Carnegie's gift, in verses which met with tumultuous applause.

Congratulations were presented by the official representatives of foreign and national engineering societies and institutions of learning, Sir William Henry Pierce speaking in behalf of the Institution of Electrical Engineers and the Society of Arts; Walter C. Kerr, a trustee of Cornell, for American universities; R. A. Hadfield for the Iron and Steel Institute; Dr. Friedrich Eichberg for the Verband Deutscher Elektrotechniker; Dr. Henry Pritchett, president of Massachusetts Institute of Technology and president of the Carnegie Foundation for Our Technical Institutions, and Julis F. Sorzano de Tejada for the Société des Ingénieurs Civils de France. John F. Wallace, well known through his connection with the Panama Canal, read a letter from G. F. Benzenberg, president of the American Society of Civil Engineers. C. Kirchhoff, as representative of the Verein deutscher Eisenhuettenleute, presented an address of welcome designed by the Düsseldorf artist, A. Linz. Carl Hering of Philadelphia spoke for the Société Internationale des Electricians, and Leon Gaster for the Faraday Society. The Canadian Society of Civil Engineers sent greetings by letter through its president, H. McLea Walbank, the Associazione Elettrotecnica Italiana was represented by

J. W. Lieb, Jr., and the Society of Naval Architects and Marine Engineers by N. Baxter, Jr., its president.

A journey to Europe, necessitated by a sudden death in his family, made it impossible for Dr. James Douglas to present the address, which was to be the principal feature of the function.

Charles F. Scott, chairman of the John Fritz Medal Board of Award, presented the John Fritz gold medal to Prof. Alexander Graham Bell, the inventer of the telephone, John Fritz himself being called to the chair with the enthusiastic approval of the audience. The announcement was made at this occasion that Professor Bell was about to sail for Europe in order to receive the degree of doctor of science at Oxford University.

The proceedings closed with the presentation by Dr. A. R. Ledoux on behalf of the three founder societies of a commemorative medal for distinguished services to the three men who have been the executive officers of those societies for periods exceeding 20 years—Ralph W. Pope, secretary of the American Institute of Electrical Engineers; Dr. F. R. Hutton, past secretary of the American Society of Mechanical Engineers, and Dr. R. W. Raymond, secretary of the American Institute of Mining Engineers. The medal was modeled by the well-known artist, Victor Brenner, who also designed the John Fritz medal.

The Little Marvel Heating Furnace.

Knowledge of the wastefulness and inefficiency of old style open heating forges has led to the invention and introduction of a number of modern devices for heating

The Little Marvel Oil Burning Furnace Made by the Russell Economical Furnace Company, Chicago.

iron and steel bars. One of the latest types, adapted for burning oil, is the Little Marvel furnace illustrated herewith and manufactured by the Russell Economical Furnace Company, 40-42 West Quincy street, Chicago.

This furnace is built in compact and convenient form and is adapted to heating round, square, flat and angle bars, or any other shapes and sizes coming within the range of its capacity. The roof of the furnace is a hollow casting, the center of which is lined with fire brick. The blast is introduced at the top of the furnace passing through the hollow brick lined chamber directly into the pipe connected with the oil burner. The pipe which conveys oil to the furnace also passes through the hollow casting, thus heating the oil before it reaches the burners. This practice is said to result in the saving of a large percentage of fuel, due to more perfect combustion obtained by superheating the oil. It is also claimed that a cheaper oil may be used in this way than would be possible with cold feeding.

As will be seen in the accompanying illustrations the stock is fed automatically into the furnace through a hopper and incline, which at the same time conserves the heat and secures a gradual heating of the material. These furnaces are built in two sizes, No. 0 and No. 1. The dimensions of the No. 0 furnace are as follows: Firebox, 6 x 8 x 12 in.; size of the opening into the heating space, 24 in. long by 1½ in. high on each side of the furnace; floor space required, 16 x 21 in. The No. 1 furnace has the following dimensions: Size of firebox, 9 x 12 x 12 in.; heating space, 28 in. long by 2 in. high on each side; floor space, 21 x 21 in. Heats of any length up to 14 in. may be made on bars of any length that the location affords space to handle.

Recent Customs Decisions.

The Duty on Cold Rolled Steel Strips.

After a long litigation the United States Circuit Court of Appeals has affirmed the decision of the Circuit Court in the case of the Government against the Crucible Steel Company, involving the classification of cold rolled steel strips used in the manufacture of car springs. As the verdict stands it is a victory for the importers, who for several years have been contending in the courts that the strips are not sufficiently brightened or polished to make them subject to the additional duty of 1 cent per pound. No objection is made to imposition of the regular duty, but the importers have opposed the levy of the extra rate.

It is provided in the Dingley tariff act that when strips are fully polished they shall be liable to the additional duty, and in two distinct proceedings before the Board of United States General Appraisers and the federal courts, the Government has maintained that the strips in question are improved sufficiently to bring them within the purview of the additional duty proviso. In the earlier litigation, as now, the Treasury Department was uniformly defeated. The Circuit Court of Appeals, in its decision handed down April 12, renders no opinion, merely affirming the finding of the tribunal below. The decision affirmed had been made by Judge Lacombe, and was as follows: "I cannot see that the additional evidence as to trade designation differentiates this case from that which was before the Court of Appeals. That court disposed of the questions presented upon the theory that Congress used the terms it employed with the meaning which had been theretofore given them by the customs authorities under earlier acts. There is nothing in this record to induce a contrary conclusion. The decision of the Board of General Appraisers is affirmed." In view of the outcome of the latest test case it is believed that the Government will acquiesce in the finding of the court.

Wire Rat Traps.

The United States Circuit Court of Appeals at Boston has rendered a decision in the customs controversy between the Burditt & Williams Company and the Government, in which it is held that the Treasury Department is not authorized by the terms of the tariff act to levy an additional duty of 2-10 cent per pound on wire rat traps. In one form or another this issue has been in litigation for several years. The merchandise consists of rat traps made in part of wire and in part of other material. The Collector of Customs classified the articles for duty under paragraph 137 as being manufactured from wire. When the importer's protest came before the Board of United States General Appraisers, that tribunal found the merchandise to be subject to a tax of 45 per cent. under the provision in the law for manufactures of metal. As this claim was not made by the importers their claim was overruled.

An appeal was then made to the Circuit Court in which the claim was advanced that the traps should have been classified under the provisions in the first part of paragraph 137 for wire of various gauges, the duty for each gauge to be assessed according to the quantity of wire of that gauge found in the articles. The protest was amended in the Circuit Court to include the claim for duty at 45 per cent. as manufactures of metal. The Circuit Court, however, decided that the extra duty must accrue. The appellate court now reverses the lower tribunal and holds that the additional duty is illegal. Under this interpretation of the tariff the traps will be assessed only the regular duty, which is 1¼ cents per pound.

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The Ascendancy of Basic Steel.

Now that the output of steel ingots and castings in Germany in 1906 is known it will be of interest to make comparison of the steel production of the three leading countries and to note any tendencies shown by the statistics. What is most significant and at the same time most palpable in the assembled figures is the story they tell of the increasing phosphorus content of the ores being drawn upon each year by the steel industry of the world. The basic furnace lining is playing a larger part year by year in the manufacture of steel at the same time that the engineers of the important consuming interests are more insistent in crowding down the phosphorus limit in the steel they use.

If we count the world's steel production in 1906 at 49,000,000 gross tons the contribution of United States, Germany and Great Britain, which was 40,843,610 tons, leaving out crucible steel, was almost exactly five-sixths of the total. In 1905 the three countries produced a total of 35,868,764 tons, exclusive of crucible steel, so that their gain in 1906 was only 25,000 tons short of 5,000,000 tons. In making the table below we have separated Bessemer and open hearth steel and acid and basic steel, so as to compare the advances made by the respective processes. At no statistics of crucible steel production are gathered in Germany or Great Britain only Bessemer and open hearth steels are considered. Gross tons are used for the United States and Great Britain and metric tons for Germany:

Bessemer and Open Hearth Steel Production of the United States, Germany and Great Britain in 1906.

	United States.	Germany.	Great Britain.	Increase over 1905.
Acid Bessemer	12,275,253	407,688	1,307,149	1,249,498
Basic Bessemer	.....	6,772,804	600,189	591,310
Acid open hearth	1,321,613	230,668	3,378,691	526,884
Basic open hearth	9,649,385	3,534,612	1,176,245	2,662,686
Castings	Incl. above.	189,313	Incl. above.	.....
Totals	23,246,251	11,135,085	6,462,274	.....
Total 1905	19,912,751	10,066,553	5,889,460	.....

A significant feature of the above table is that the gain made by basic open hearth steel last year was considerably more than that of acid and basic Bessemer and acid open hearth combined, while the gain of basic steel is nearly twice that of acid steel. The fact that in the German statistics there is no separation of steel castings made from converter metal and those made from open hearth metal prevents exact comparison, but the castings total is not such as to signify greatly. Each of the three countries made a record output of steel last year, but it is to be noted that acid Bessemer steel fell off from 1905 in both Germany and Great Britain—a decrease of 16,508 tons in the former and of 66,872 tons in the latter.

The pre-eminence of the United States in steel making is emphasized in the returns for 1906. Not only did this country make a third more steel than the combined outputs of Germany and Great Britain, but the increase in the United States over 1905—about 3,333,000 tons—was twice as great as the combined increase in Germany and Great Britain, made up of 1,068,000 tons in the former and 572,000 tons in the latter.

The preponderance of steel from basic lined furnaces, which has been a feature of the world's statistics of steel production in recent years, has apparently not received attention, emphasis having been laid so long on production by the pneumatic as distinguished from the regenerative furnace process. In 1904 the production of basic steel first exceeded that of acid steel in the combined outputs of the United States, Germany and Great Britain. Owing to incomplete separation of the figures in Great Britain we can go back only to 1902 to trace the increasing prominence of ores of higher phosphoric content in the steel production of the three leading countries. The data in the table below are from the official statistics in the respective countries, gross tons being used for the United States and Great Britain and metric tons for Germany:

Acid and Basic Steel Production, 1902-1906, *in United States, Germany and Great Britain.*

UNITED STATES.

	Acid steel.	Basic steel.
1902	10,329,559	4,496,533
1903	9,687,827	4,734,913
1904	8,660,939	5,106,367
1905	12,097,023	7,815,728
1906	13,596,866	9,649,385

GERMANY.

	Acid steel.	Basic steel.
1902	517,996	7,262,686
1903	613,399	8,188,116
1904	554,288	8,223,189
1905	655,495	9,290,296
1906	715,952	10,419,133

GREAT BRITAIN.

	Acid steel.	Basic steel.
1902	3,833,888	1,075,179
1903	3,930,189	1,103,912
1904	3,712,506	1,314,373
1905	4,439,067	1,373,215
1906	4,685,840	1,776,434

	Acid steel.	Basic steel.
Totals 1902	14,681,443	12,834,398
Totals 1903	14,231,415	14,026,941
Totals 1904	12,927,733	14,643,929
Totals 1905	17,191,585	18,479,239
Totals 1906	18,998,658	21,844,952

It will be seen that while the United States and Great Britain are strongholds of acid steel, Germany and the United States have made large use of the basic lining, this country employing such linings in open hearth furnaces only, while Germany uses both the basic converter and the basic open hearth furnace. In 1903 basic and acid steels were close to a parity, taking the totals for the three countries, but in 1904 the balance swung to the basic lining and has remained there since. All the indications are that the basic preponderance will grow. If the United States must resort more and more to the basic open hearth furnace because of an increasing phosphorus percentage in each year's yield of ores, countries less favored in respect to high grade ores would naturally be expected to show a stronger drift in the same direction. However, as Great Britain is bound to import a considerable percentage of her ores each year, and must therefore get as high an iron content as possible, the acid process may be more persistent there than in the United States. Though Germany has been regarded as wedded to the basic Bessemer converter, it would appear that good progress has been made there by the basic open hearth furnace in recent years. Thus, while German basic Bessemer steel production increased from 4,888,054 tons in 1902 to 6,772,804 tons in 1906, or 38 per cent., basic open hearth steel in Germany advanced from 2,304,495 tons in 1902 to 3,534,612 tons in 1906, or 53 per cent. As basic

Bessemer production grew, more scrap was made, and as the converter could take little of this the building of more open hearth capacity was natural.

Assisting the Student Engineer.

Manufacturers and other who employ engineers are co-operating more and more actively with the technical and engineering schools in the training of the students who are to become important factors in the industrial development of the country. The increasing difficulty in securing competent engineers has very naturally brought with it a greater interest on the part of employers in the institutions that educate them. Probably there are few members of this year's graduating classes who have not already received at least one offer of a position. To a less extent this has been the case for some years. The first rate men have been able to choose from several opportunities to begin the practical work of their profession, and most students who have survived the severe courses of the American technical school and received their diplomas have had little time to wait for suitable employment. But this season the competition for the services of the young engineers is keener than ever, just as the demand for all classes of skilled labor is greater.

Employers have found from experience that the student of the engineering school—a term which may be used to cover all classes of institutions which educate engineers—who is given opportunity to carry on work, in test and experiment, amid commercial surroundings, is much more valuable during the first years following graduation than if his time had been exclusively employed in the lecture room and laboratory and school shop. Some of the crudeness resulting from lack of experience is rubbed off in making the practical application of engineering problems. Appreciable trouble may be involved for the employer who opens his works to the student engineer, and possibly a little expense, direct or indirect. But usually the student, working under the direction of competent instructors, does valuable and useful service. The mill, factory, railroad or shipyard furnishes the environment which turns the student's mind to the practical side of his work, having the tendency to stimulate his intellect along the more theoretical and all-essential lines of his regular courses.

Many students of the engineering schools pass their vacations in practical employment, usually because they require the money for the continuance of their education, but occasionally because of a deep interest in the work they have begun. Sometimes their services may not be worth quite as much to their employers as their pay would indicate. They are accepted on somewhat the same general basis as apprentices, in considering the financial aspect of the engagement, in the hope that they will develop into the kind of engineer whose skill will eventually be of value. Employers who have tried the plan have found in a number of cases just the men they wanted by their contact with students during their years of school life. It is a side of the great question of industrial education which manufacturing establishments may look into to their advantage, to say nothing of the general good which must result from better opportunities in the training of the future engineers of the United States.

A first-rate illustration of practical openings for students is afforded in the proposed tests of the new turbine steamship Governor Cobb, which will ply between Boston and St. John's. Four seniors of the Massachusetts Institute of Technology, in the course of marine engineering, will conduct complete tests of the power installation, under the eyes of instructors from the institute and representatives of the Navy Department, and will prepare theses from their observations. This is a typical instance of the sort of assistance which can be extended to students, without expense, and sometimes at an actual saving of money. No one can doubt that the experience should benefit the students very greatly, and that quite possibly it may have an important bearing upon their careers. Similar opportunity, not always as spectacular, of course, but fully as important from an educational point of view, would be frequently available if employers would have the matter in mind. Manufacturers, managers of steam and electric railroads, builders of great edifices, mine owners and others through the broad field of American industrial enterprise have already made a beginning in an educational work which seems likely to expand as its results become better established and better known.

Pittsburgh in the Pig Iron Trade.

Of the total production of 25,307,191 gross tons of pig iron in the United States in 1906 Pennsylvania made 11,247,869 gross tons, and of this output the Pittsburgh District (Allegheny, Beaver and Washington counties) contributed 6,230,863 tons. In other words, the Pittsburgh District last year made nearly 25 per cent. of the total production of pig iron in the United States, and 55 per cent. of the output in Pennsylvania. Although it makes so large a part of the production of the country there are only four individual producers of iron in the district, these being, in the order of their size, the United States Steel Corporation, the Jones & Laughlin Steel Company, the Midland Steel Company and the Clinton Iron & Steel Company. The district now contains 45 blast furnaces. The Carnegie Steel Company operates 30, the American Steel & Wire Company 4 and the National Tube Company 3, these concerns being affiliated interests of the United States Steel Corporation. The Jones & Laughlin Steel Company owns and operates 6 stacks, the Clinton Iron & Steel Company 1 and the Midland Steel Company 1, the last named having been finished and started late last year. The oldest stack is the Clinton, which was originally built in 1859, but which has since been rebuilt and enlarged three times. Another peculiar feature of the Pittsburgh pig iron trade is that only about 0.3 per cent. of the total output is sold in the open market, this being the product of the Clinton and Midland companies, aggregating about 600 tons per day. Neither of these companies has steel works or finishing mills to use its pig iron. Pittsburgh therefore cannot be regarded as a prominent seller of pig iron, that distinction going to the Mahoning and Shenango valley districts, which sell a great deal of pig iron used by Pittsburgh consumers.

The Carnegie Steel Company alone in its 30 furnaces makes about 75 per cent. of all the pig iron made in the district and will soon make a much larger percentage, as the company will shortly blow in two new Carrie furnaces at Rankin, with a combined daily capacity of 1200 tons, and making a total of seven stacks at that plant. The United States Steel Corporation has made an appropriation for the building of two more blast furnaces at Duquesne, which will make a total of six at that plant, and one more furnace at McKeesport, for the National Tube Company, which will give it a total of four stacks. These furnaces are expected to be active producers of pig iron within a year. The Jones & Laughlin Steel Company last October completed plans for new blast furnaces, steel works and finishing mills at Aliquippa, the initial plant to contain four blast furnaces, with a daily

capacity of 500 tons each. The contract for these furnaces has been placed and two of them are expected to be making iron before the close of this year. It will be seen, therefore, that within a year, or at furthest 15 months, the Pittsburgh District will be a much larger producer of pig iron than it is at present, the combined new capacity at Carrie, Duquesne, McKeesport and Aliquippa being estimated at 4500 to 5000 tons daily. None of the product of this new capacity will find its way into the open market, but will be used by the makers in their own steel works.

Business Value of the Club or the Luncheon Hour.

There are some important American industrial communities which are not making the most of their opportunities because their manufacturers are without the means or inclination for frequent meeting in a social way. In the large cities there are so many clubs, and so many of the business men live in the suburbs, that club life plays comparatively little part in business, except during the luncheon hour. This period has therefore grown to be a highly appreciated part of the business day. Meeting at such a time men come to know their competitors or customers or those of whom they do their own buying, on the basis of a social, friendly and perhaps gossipy hour. It is recognized as an adjunct of business without which conditions would indeed be very different. Some smaller cities and large towns are strong in their club life. They have few clubs, because the population will support no more, and consequently men must meet frequently under the same friendly roof. The result is the strongest kind of co-operation or of team work, where every one helps every one else. Waterbury, Conn., is a fine example of this sort of spirit. Cincinnati affords a striking instance of a place where men in the same line of trade—machine tools—work together with the best of co-operative assistance. No one will dispute that such places have a vast advantage over those where the manufacturers meet but seldom, and then usually by chance and without the intimate friendliness which comes with repeated social hours together. In communities where manufacturers meet but casually the old-fashioned kind of competition too frequently exists, with its occasional tinge of jealousy, and the inclination is found to go to other cities for what might as well have been purchased of a brother manufacturer in the home city. In such a place a common luncheon point or a club frequented by men in similar lines would soon bring about a beneficial change.

Cost Systems and the Machine Tool Trade.

The National Machine Tool Builders' Association is expected to take up the matter of machine tool costs at its coming meeting. This is a subject that has little direct bearing upon the trade at present, when there is enough business for every one at a full margin of profit, but in duller times the matter is one of great importance. When business is scarce, and there is keen competition for every order, the pressure from machine tool builders who have no adequate cost system to guide them in fixing their prices becomes a most serious matter. They usually underestimate the cost of their machines and consequently offer them at prices which mean taking business at a loss or without a profit. It is an unconscious "dog in the manger" policy, for it realizes no profit for the offender while it prevents others from getting their due share of the business.

With an accurate cost system, and one not necessarily complicated nor expensive, the manufacturer knows beyond a doubt what he can sell at without sustaining a loss. It is confidently stated that if every machine tool builder in the country had such a system, prices during dull times would be materially higher than with manufacturers in the market who practically guess at costs. It is almost always found by those who install a good method of finding costs that some of their products have been selling at too high and some at too low a price. The Machine Tool Builders' Association has considered the preparation of a model cost system, simple and inexpensive in its operation, the adoption of which would then be urged upon those who are not already equipped to get the complete story of the cost of their product. The subject was broached at the meeting a year ago, but conditions have not been ripe for pushing it, the direct incentive being lacking in the rush of business. However, it should be remembered that the time to act is in advance of the necessity.

The Mechanical Engineers' Meeting.

The programme for the dedication exercises of the Engineering Societies Building, as previously announced, included holding professional sessions by the founder societies. The American Society of Mechanical Engineers held its meeting Thursday evening in the main auditorium of the new building, and listened to a very interesting address by Brigadier-General William Crozier, chief of ordnance, United States army, on "The Ordnance Department as an Engineering Organization." To those engaged in what may be called the peaceful branches of engineering and of whom the society is principally composed it was exceedingly instructive to have a little insight into the work of the military engineers. The speaker began by quoting the definition of engineering, as found in Webster's dictionary, "The art and science by which the mechanical properties of matter are made useful to man in structures and machines," and proceeded to show the right of the military engineer to be included as a participant in such an art and science.

As an illustration of some of the engineering problems that a designer of ordnance, for example, is called upon to solve, General Crozier led his hearers through the outskirts of the mathematical mazes involved in determining the theoretically correct manner of arresting the recoil of a gun on a disappearing carriage. Lantern slides were used to show by diagrams and formulæ some of the steps in such calculations, and diagrammatic illustration of the disappearing carriage invented by the speaker and bearing his name was received with applause. Many of the audience had been privileged to be present at the inspection trip to the Sandy Hook Proving Grounds last December during the convention of the society in New York, and to them it was especially interesting to know something of the design of the gun carriage that they had there seen in action.

In closing, the speaker defended his vocation from an ethical standpoint, maintaining that it is not antagonistic to the sentiments and purposes of the Peace Congress then in session. It appeared to be his desire that the engineers of the army and navy might be considered as co-workers in any movement for universal peace, rather than the opposite, for certain it is that the more deadly war is made the greater will be the efforts to avoid it. His argument made it clear that vigilance in the perfecting of means of offense and defense could not afford to be relaxed, and on that point his position was positively defined.

A number of officers from the Ordnance Department were present as guests of the society, and a short informal reception and inspection of the building followed the address.

British Columbia will next year tax iron ore and offer a bounty on pig iron.

Reinforced Concrete Cable Towers.

Probably the first reinforced concrete towers ever built in place were those recently erected at Brownsville, Pa., by the West Penn Railways Company, to carry electric cables over the Monongahela River. The main tower rises 115 ft. above its foundation and supports one end of the company's transmission line crossing the river at this point. The second tower, only 55 ft. high, acts as an anchorage and takes the direct strain of the main span. The following is taken from an account of the work, prepared for the Connellsville *Weekly Courier* by F. W. Scheidenhelm, mechanical engineer for the West Penn Railways Company.

The problem was to support a 1014-ft. span across the river at a minimum hight above low water of 79½ ft. to provide the prescribed Government clearance for navigation. On the Brownsville side of the river the span anchorage is in the local substation, a strongly built brick, concrete and steel structure. On the West Brownsville side some form of tower was found necessary. As between the use of reinforced concrete and steel comparative estimates of cost and considerations of maintenance gave the preference to reinforced concrete, and it was decided that two towers would be necessary, the main or higher tower being built as close to the river bank as practicable, and designed to take as a maximum load only the wind stress on the tower itself and the weight of the wires, and the shorter tower, built about 230 ft. back of the main tower, and having the cables anchored to it.

Design of the Towers.

In addition to the wind stress the main tower receives minor stresses in the direction of the span and a direct vertical compression. The cables were assumed to be liable to the extreme condition of an ice coating as thick as the cable, with a wind stress of 20 lb. per square foot upon the resulting projected surface. The wind load on the main tower used in connection with the resulting stress due to wind on the cables was assumed to be 40 lb. per square foot. The anchorage tower was designed to carry a pull of 122,000 lb. at an average distance of 38.5 ft. above the base. The stress due to the wind was found to be amply taken care of after the tower had been designed to take the direct pull of the cables.

Both towers were designed as cantilevered beams. The main tower being subject to maximum wind stresses in directly opposite directions it was necessary to insert additional steel and thus reduce the economy of a reinforced concrete section, which should ordinarily receive stress in one direction only. To offset this reduction in economy it was determined to make the section a hollow square with walls 1 ft. thick. Though the section is square the position of the reinforcement makes it somewhat stronger along the axis parallel to the wind stress.

At its base the main tower is 8 ft. 2 in. square. A uniform batter on all sides makes the tower pyramidal in form up to its top, where the section is practically 1 ft. square. At a point 84 ft. above the base the section becomes solid.

The anchorage tower is a reinforced concrete structure in the strictest sense. Each horizontal section was treated as a beam to withstand a bending moment, which does not reverse in direction. Hence the fullest economy was obtained and a solid section was used, since no surplus steel was required in order to provide for varying conditions of stress. This tower is 4 x 10 ft. at the base and batters up to a section 1 ft. square at 41 ft. 1 in. above the base, the tension side being vertical. Above this point the tower is of uniform section up to its full hight of 55 ft.

The Reinforcement.

For reinforcement old T-rails were used. All of the rails forming the vertical reinforcement were of 60-lb. section, end to end connection being made with the ordinary splice plate. The large cross section of each rail was a disadvantage in certain sections of the towers, because it was necessary to insert the full cross section of a rail, even though only a fraction of it was required by the stress to be carried. The base section of the main tower contains 12 60-lb. rails, three being placed at each corner, while the base section of the anchorage tower contains 10 rails in the tension side and two in compression. Thus the main tower contains 1.73 per cent. of steel and the anchorage tower base 1.25 per cent.

In addition to the vertical reinforcement of rails, a spiral winding was used, consisting of discarded ⅜-in. cable, obtained at various ferries along the river. Two spirals were wound 1 ft. apart, thus giving a 2-ft. pitch. Wires secured the spiral winding to the vertical reinforcement.

There was no rock near enough to the surface to anchor the towers economically and spread concrete footings for both towers were substituted. For the main tower a base of 30 x 30 ft. was required to prevent overturning. Because of comparatively weak soil under the main tower footing openings were left for driving piles throughout the footing if this should be found necessary in the future. Under the anchorage tower a firm clay was found which allowed the use of a footing 10 x 31 ft. Both footings taper to the outer edge, where the thickness is 18 and 12 in., respectively.

The footings were reinforced by rails, which were placed 2 ft. on centers and in two tiers in the form of a grillage. All tower rails which enter the footings and which are liable to take tension were bent nearly at right angles to form a 4-ft. hook. This hook was then inserted beneath the lower tier of footing rails. Thus an admirable bond was formed between tower and footing in each case.

The Concrete.

Gravel concrete was used exclusively. The gravel used for the footing was rather coarse, but that used in the tower concrete was specified to pass a 1-in. ring. The sand was clean and sharp. Atlas Portland cement was used, the resulting concrete finish being almost white after thoroughly drying. For the footings the proportions were 1 : 2½ : 5, and ,for the towers themselves 1 : 2½ : 4. The concrete was put into the tower forms so wet that it would readily flow, and the result was a smooth and pleasing finish.

The entire work was done by the West Penn Railways Company, and hence the use of motors was found to be extremely economical. Current was obtained from the local secondary system. Two Wagner single phase 220-volt motors were used. One of 7½ hp. drove by belt a Williams friction hoist. The other, of 10 hp., drove a No. 1 Ransome mixer, also belt connected.

Falsework and Forms.

Inasmuch as work on the lower tower of the anchorage was not begun until the main tower was complete the same lumber was used in the falsework for both towers. The falsework was kept sufficiently in advance of the forms to allow of the hoisting into place of the 30-ft. rails. These were brought in through the falsework by block and tackle attached to a platform at the top. As the work progressed the falsework was securely braced against the completed portions of the tower and thus was never unsupported for a greater hight than 50 ft. For the anchorage tower the falsework was carried at once to its final hight of 60 ft. Because of its lesser hight the work on this tower was necessarily much simpler.

One of the most serious problems was designing cheap and satisfactory exterior forms. The difficulty was that no two forms could have the same dimensions. Three complete forms, each 6 ft. high, were built for each tower, there being sufficient good material left over from the main tower forms to make up the anchorage forms. After stripping, each form had to be cut down to the proper section and reassembled. This was accomplished by lowering the form to the ground, where the carpenters had ample room to work, and then hoisting it into its new position.

The steps for the main tower are ¾-in. irons, 1 ft. on center, with a 14-in. tread, and a drop of 1½ in. to prevent slipping of the foot. The center of each step is

6 in. from the face of the concrete, and the legs, extending 8 in. into the concrete, are slightly bent to give a stronger hold.

Additional bond between courses was provided besides vertical reinforcement and spiral winding. This consisted of 3-ft. sections of 1-in. cables, which were inserted for half their length at 6-in. intervals in the top of each section after the form was filled. With the added precaution of roughening and wetting the top of each course before the succeeding form was filled a bond was obtained such that the actual joint can hardly be detected. The time from the filling of the first main tower form to its completion was 25 days, while the corresponding time for the anchorage tower was eight days. The average number of men employed was about 15.

The Completed Work.

The towers were designed to carry 16 cables, of which 14 have been put up and are in service. All are of silicon bronze, and were furnished by the John A. Roebling Sons Company. Four carry the 22,000-volt three-phase circuit, one being a square cable, and are made of 61 No. 15 wires. The other 10 cables carry 6600 and 2200 volt circuits, and are made up of 19 No. 15 wires. The cables are approximately ½ and ¼ in. in diameter. At the main tower the cables are supported by roller bearing saddles. Each saddle consists of a number of old trolley wheels.

The main tower has cross arms made of 4 x 6 x ½ in. angles, braced vertically at the ends of the arms by 3½ x 5 x ⅜ in. angles. At the anchorage tower the ½-in. cables are "dead-ended" in a rope socket joint in an iron yoke, connected by loops of ¼-in. cable to two strain insulators. The 10 ¼-in. cables are tied directly to strain insulators, which are held between cross arms, consisting of 12-in. channels.

The tower superstructures were designed by L. O. Veser, while the towers themselves were designed and constructed by F. W. Scheidenhelm, both of the same company.

Germany's Steel Production in 1906.

The production of steel in Germany in 1906 has been ascertained by the German Iron and Steel Association. Out of 101 plants statistics were received from 98, the output of the remaining three being estimated. The table below gives in metric tons the total production of Bessemer and open hearth ingots and castings, separating the product according to the basic and acid processes. The increase over 1905 is seen to be 1,068,532 metric tons, of which 1,008,075 tons was basic and 60,457 tons acid steel:

	Acid.	Basic.	Totals.
Bessemer ingots	407,688	6,772,804	7,180,492
Open hearth ingots	230,668	3,534,612	3,765,280
Steel castings	77,596	111,717	189,313
Totals	715,952	10,419,133	11,135,085

Comparisons are made with previous years, as follows:

	Acid.	Basic.	Totals.
1905	655,495	9,411,058	10,066,553
1904	610,697	8,319,594	8,930,291
1903	613,399	8,188,116	8,801,505
1902	517,906	7,262,686	7,780,682
1901	465,040	5,929,182	6,394,222
1900	422,452	6,223,417	6,645,869

The increase in steel production in Germany in recent years is seen to be substantially all in basic steel, which since 1901, with the exception of 1904, has shown an average increase of more than 1,000,000 tons a year.

The Birmingham Iron Company, Birmingham, Ala., has reorganized with the following officers and directors: H. M. Atkinson, president; P. S. Arkwright, vice-president; James Bonnyman, acting manager and treasurer; W. L. Web, secretary; P. S. Arkwright, Augustus Venners, T. J. Manson and Richard Peters, Jr. The company is building a new furnace, which will be known as Vanderbilt No. 2 and which it expects to put in operation in September. In addition two large mines are being operated in the vicinity of Birmingham, which will be equipped with the latest machinery, including steel tipple, &c., and will have a combined capacity of from 3000 to 4000 tons per day. New mines at Short Creek are also being opened and 60 coke ovens, now under construction, are more than half completed.

Sandusky Coal Shipping Facilities.

Harbor improvements by the Government and new facilities provided by the transportation companies have brought about a vast increase in the shipment of coal from Sandusky, Ohio, over the Great Lakes. The spring rush in lake coal traffic will begin next month, and extensive preparations have been made by the land and water lines to handle it.

By replacing the old Thornburg car dumper by a McMyler machine of the latest model the Pennsylvania lines will be able to send out 1,000,000 tons of coal this year from Sandusky; the amount sent out last year was 475,000 tons. The new car dumper on the water front is nearly finished and will be in full operation next month. It is so constructed that when a coal car approaches a smaller car, called "the goat," rises from a depression between the rails, meets the loaded car and pushes it upon the platform of the dumper. At the same time it pushes off the car which it has emptied. Then the platform bearing the big car, with 60 tons of coal aboard, is raised by cables until it reaches the level of a chute. Cables then clutch one side of the car, turn it over and the coal rushes down the chute into the hold of the waiting vessel.

When a car is emptied it rolls off the dumper, down an incline and into the yard for empty cars. The dumper has a capacity of 25 cars an hour. This means that every hour 1500 tons of coal can be loaded into the ships alongside. A large storage yard, with room for 175 cars, is one of the new improvements. It will have room to receive all cars of coal offered for shipment, and there the cars will wait, near the dumper, to be promptly unloaded as soon as the boats arrive. The company has rebuilt the approaches and docks and has dredged out the channel near its docks.

The Wilmington Iron Company, whose works are at Wilmington, Del., has increased its capital stock from $250,000 to $400,000, the increase of capital to be used to pay off the entire mortgage indebtedness, which amounted to $150,000, and to secure some additional working capital to build more puddling furnaces, to put in some new power equipment and generally to increase the output of refined merchant bar iron. James G. Hemsted, formerly connected with the Oliver Iron & Steel Company, Pittsburgh, Pa., has been placed in charge of the works as vice-president and general manager. Mr. Hemsted is a thoroughly practical rolling mill man, and under his management excellent results have already been obtained.

The Federal Furnace Company, Chicago, a description of whose new blast furnace appeared in *The Iron Age* of July 19, 1906, has filed a first mortgage to the Superior Savings & Trust Company of Cleveland, as trustee, to secure $1,000,000 of 5 per cent. gold bonds of $1000 each, dated November 1, 1906, of which series A, $600,000, was issued to refund existing indebtedness (no prior liens remain outstanding), and series B, $400,000, is reserved for improvements and extensions, the company planning to proceed with the erection of a second blast furnace. The capital stock was increased in December, 1906, from $600,000 to $800,000.

The Wheeling Board of Trade, Wheeling, W. Va., has brought out the "Souvenir History of Wheeling," as a means of directing attention to the manufacturing possibilities of the city. The work is not only superbly illustrated but in all other respects is a most creditable production.

Thomas B. Riter.

After an illness lasting about eight months Thomas B. Riter, president of the Riter-Conley Mfg. Company, Pittsburgh, died at his home in that city on April 23. He was born at York, Pa., in 1840. He went to Pittsburgh when quite young and secured employment with Marshall Brothers, elevator manufacturers, with whom he remained many years. James M., an elder brother, founded the present company, starting in 1858 a steel construction shop at 55 Water street. Thomas Riter began to work for his brother as a blacksmith and learned the details of steel construction. When in the later sixties the oil production in Pennsylvania assumed great proportions the Riters launched into the tank building business and soon had a practical monopoly in this class of steel construction.

After the death of James M. Riter in 1873 Thomas B. Riter and the firm's bookkeeper, W. H. Conley, bought the plant from the widow. In 1898 Mr. Conley died and Mr. Riter incorporated the Riter-Conley Mfg. Company, with a capital of $900,000, becoming the president and taking into partnership with him several young employees who

THOMAS B. RITER.

had distinguished themselves in their several departments. Among these were John S. Craig, W. C. Coffin and Robert A. McKean.

The firm built practically all the blast furnaces in Allegheny County, and has for years been represented all over the world. Among its important foreign contracts was the erection of three blast furnaces and the open hearth steel plant for the Dominion Iron & Steel Company at Sydney. The company has done much work in South African mining camps. All over Mexico and South America may be found work planned and directed by Mr. Riter.

At present the company is engaged on the construction of the blast furnaces of the United States Steel Corporation at Gary, Ind. It built the great refinery of the Gulf Refining Company of Pittsburgh, at Port Arthur, Texas, and the Burke refinery at Beaumont, Texas, with tanks that are among the largest in the world. Its work in the Beaumont field alone represented about $3,000,000.

Mr. Riter was for many years director of the Mechanics' National Bank, and organized and was president of the Ohio Valley Bank. He was a member of the Engineers' Society of Pittsburgh, and a director of the United States & Nicaragua Company. He leaves a widow and a son, Joseph Riter.

An Isolated Lighting Plant.—An interesting combination of wind and water power for electric lighting is in operation at Noblesville, Ind. The apparatus employed consists of a 14-ft. Star windmill on a 50-ft. tower, driving a plunger pump which delivers water to a cylindrical reservoir. The hydrostatic pressure in the reservoir is automatically maintained at 75 lb. per square inch by means of weights placed upon a plunger in the cylinder. When desired this water, under constant pressure, is used to drive a ½-hp. turbine wheel, which is direct connected to a ¼-hp. 25-volt dynamo, arranged to charge a storage battery of 11 cells. The battery has a capacity sufficient to supply electricity to 20 8-candle power lamps for 3 hr., or to five similar lamps for 6 hr., when operating alone. By means of automatic hydraulic devices the pump is permitted to store any energy which the windmill may produce, while automatic electric devices allow this energy to be used when needed. It is stated that with this equipment enough electricity for winter use can be obtained from 5 hrs.' operation per day of the windmill, on the average, while during the summer months only 2 hr. per day will be needed.

One of the most unique operations of salvage afforded by the records of the industry was that effected upon the White Star liner Suevic, 12,400 tons, which went ashore on the Lizard rocks, on the south coast of England, March 17. By the use of dynamite the bow, 180 ft. in length, and held fast by the rocks, was severed from the stern, and the freed after portion, 400 ft. long and containing the engines and boilers, was towed to Southampton for repairs. The ship was towed stern first, her watertight compartments keeping her afloat, and during a portion of the trip her own engines assisted those of the tugboats having her in tow. The weather was rough, and the entire operation was carried on under great difficulties. It is said that the bow rests on the remains of two previous wrecks, the location being one where wrecks are exceedingly frequent. This operation followed a smaller one of the some sort upon the Highland Fling, which was wrecked a few days previously.

That no oil is needed in the valve chests and cylinders of engines is the contention of a certain Southern engineer. In carrying out this idea he forbade the use of oil or grease when boring or tapping, claiming that if no lubricant is allowed to touch the iron the condensed steam will adhere to it, and take the place of the oil that is habitually used. An engine on which this was tried was taken apart after several years of service and the cylinder and valve seat were found in excellent condition. No perceptible wear could be detected by calipers and straight edges. While this proved that oil is unnecessary as a preventive of wear, it did not show cause for abandoning the use of oil in cylinders of steam engines, because when the indicator was applied to this engine the steam consumption was found to be greater than it should have been. A lubricator was then attached to the steam pipe, and the result was a saving of one-third of a pound of coal per horsepower hour.

Molten aluminum has a decided tendency to oxidize, and the losses from remelting are considerable, especially if the divisions of the scrap are fine. So marked is this oxidation that it is all but unprofitable to remelt turnings, borings, &c., unless they are baled as tightly as possible. Small quantities of the metal can be baled by the hand cabbaging pot, and large quantities by the hydraulic cabbaging press. The fact that borings are covered with more or less grease does not make the metal difficult to remelt. It means that the purchaser pays for the oil as well as for the scrap he buys. The only precaution which can be taken where borings are to be melted is to force them (or any other finely divided aluminum scrap) under the surface of other molten metal, if possible, so that in melting they will not be exposed to the air.

The Massachusetts Antistock-Watering Laws.

Before the National Association of Cotton Manufacturers, Everett M. Burdett of Boston has delivered a thoughtful and polished address on "Corporations and the Public Welfare," in which he reviews the effect of the antistock watering legislation in Massachusetts, the pioneer State in this field. We quote from it the following:

So far as I know, the first attempts at public control of private corporate enterprises through valuations of the necessary investments and limitation of the interest and dividend bearing securities issued against them were made in Massachusetts. Efforts in other jurisdictions had been largely, if not entirely, confined to drastic control and regulation of rates—a process necessarily attended with more or less brutal, because ignorant, exercises of official power. But these rates have, when judicially tested, been almost always set aside; and even the decisions of the Interstate Commerce Commission have been reversed in about 9 cases out of every 10.*

So far as public service corporations other than steam railroads are concerned they have in but rare instances, so far as I know, been made the subject of State regulation or control through special tribunals created for the purpose, but have been left at the mercy of State legislatures, or, worse yet, of the various municipal authorities where they operate. This policy, or rather, lack of policy, has forced these corporations more or less into State and local politics—a course justified, if at all, by the dictates of "the first law of nature"—that of self-defence.

When Massachusetts Began to Regulate Corporations.

But in 1894 Massachusetts entered upon a more enlightened experiment in public regulation and control of private enterprises of a quasi public character. It adopted the plan of absolutely controlling the issue of future securities against the properties of such corporations, whether in the form of stocks, bonds, notes or other evidences of indebtedness. While it did not, and could not, undertake to reduce the amount of such securities already outstanding, it gave to public boards of a more or less judicial character effective control over the returns which might be realized upon them. That this control, though drastic in form, has not operated unduly to depreciate the value of property or minimize legitimate returns upon it, appears from the fact that for the nearly 13 years since it was instituted there have not been, so far as I know, a half dozen cases where those concerned have felt themselves obliged to invoke the guaranties of the Constitution in the federal courts. In fact, I recall but two such cases.

Since 1894 further statutes have been enacted, authorizing the supervisory boards to impose conditions in connection with new issues of securities calculated to repair out of earnings or otherwise impairments in capital already outstanding in excess of reasonable property valuations.

To prevent the defeat of the purpose of the laws of 1894 by the formation of foreign holding corporations, it was further enacted that if any foreign corporation holding or controlling a majority of the capital stock of a Massachusetts street railroad, gas or electric lighting company issues any stocks, bonds or other evidences of indebtedness based upon or secured by the property, franchise or stock of such domestic corporation, unless so authorized by the laws of Massachusetts, the charter of the domestic corporation is liable to forfeiture.†

This act, though brief in terms, has proved to be entirely effective, and the utmost ingenuity of counsel and investors has not succeeded (so far as I know) in inventing any successful evasion of it.

Judicial Review Provided For.

There was at first no adequate provision for a judicial review of the action of the commissioners under the statutes of 1894; but since then a statute has been enacted which furnishes an opportunity to correct mistakes of law made by the public boards.*

What has been the result of these enactments—popularly known as the Massachusetts antistock watering laws of 1894? Have they operated to oppress and harass and hinder the corporations, or otherwise? They have had ample time to demonstrate their utility or their banefulness.

In the first place they are not perfect—no human institutions are. They have not always been wisely and justly administered, but they have never been consciously used as instruments of oppression, and have never been availed of for purposes of "graft." Though the low salaries paid the commissioners have not been adequate in all instances to secure the services of the strongest men, they have been sufficient to attract the services of honest men of good intentions, who have been equally anxious to promote the public good and conserve what they have regarded as the true interests of the corporations. Mistakes have been made—narrowness of view has sometimes characterized official action; but, upon the whole, I think those concerned with corporate as well as those concerned with public interests will be found to be in practical agreement that the laws referred to and their administration have been fairly satisfactory, and that no considerable force could now be mustered from any quarter to repeal them.

But it must always be borne in mind that these commissioners are State officials, appointed by the Governor, and engaged in the discharge of duties of a public nature. They are therefore in a position to take a broader view and follow out more independent lines of action, than would otherwise be the case.

In addition to the extensive powers enjoyed by these boards under the antistock watering acts of 1904, they have very ample authority as to the regulation of rates, requirements of service and the like, under earlier statutes.

Municipal Ownership.

Nearly contemporaneously with the act of 1894 the Legislature of Massachusetts enacted a municipal ownership law. The act was passed in 1891, and received important amendments in 1893. It authorized any city or town to establish a municipal electric plant, for the furnishing of light or power to itself and its inhabitants, upon condition of its purchase of any existing plant within the limits at its fair market value for the purposes of its use, excluding franchise and good will values.

Massachusetts has therefore furnished its citizens for the last dozen years or so a fair opportunity to test the relative merits of public control of private corporations and municipal ownership of public utility services. The judgment of the public upon the relative merits of the two is, perhaps, in a measure shown by the fact that out of the 365 towns and cities of Massachusetts only a little more than 20 have availed themselves of the right to establish municipal electric works, while there have been very many instances in which the regulating machinery of the State has been put into successful operation for the regulation of rates, the requirements of supply, and so forth.

The Promotion of New Enterprises.

The one principal defect in the Massachusetts stock and bond limitation laws and their administration lies in the failure to discriminate between the conditions surrounding the promotion of new enterprises and those attaching to well established industries. As to the latter, no conclusive objection can, I think, be stated to the policy of limiting the issue of their new securities to amounts sufficient only to cover the reasonable expense of additions to plant and the returns upon them to the going rates of interest or profit legitimate in established enterprises of like character. But the pioneer assumes unusual risks and is entitled to more than usual profit, if he can succeed in getting any. But right here the Massachusetts laws fail to make a legitimate discrimination. New enterprises are dealt with with the same strictness as old ones. The pioneer, the promoter, the bold man who first

* (David Willcox, Pres. Del. & Hud. Ry.)

† Rev. Laws, chap. 126, sec. 11.

* Rev. Laws, chap. 112, sec. 100.

dares to enter into and explore a new and hitherto unexploited field, is treated practically the same as the conservative, over cautious investor.

President Eliot, in a thoughtful address,* has recently said:

> There is much to be said on behalf of the proposition that there should be no water in the stock of public service corporations; yet if this principle had been applied to all street railroad and lighting companies during the past 35 years the public would have waited long for facilities which they have greatly enjoyed and profited by. In such enterprises there are often heavy risks. . . . Hence men will not undertake them for the ordinary return on safe investments. They must be induced to venture their capital and their capacity by a prospect of unusual returns.

And he adds that it is in the interest of all classes in the community that the pioneer in a new field of industry should be allowed unusual returns if he can get them.

The great authority of the Supreme Court of the United States stands for the proposition that, even in the case of an established enterprise, a corporation finding itself in financial straits may legitimately, in the absence of statute, in order to recuperate itself and put its business on a sounder basis, issue additional capital stock at such price as can be obtained for it, even if less than par. So long as the transaction is bona fide, and not a mere cover for watering the stock, and the price obtained represents the actual value of the stock, the courts have no disposition to disturb it.† And there is much, though I think not conclusive, force in the claim which is now made, that no new legislation should impair the opportunity of existing corporations to do the same thing under similar circumstances.

Trade Publications.

Pumping Machinery.—American Steam Pump Company, Battle Creek, Mich. Catalogue No 16. Size 6½ x 7½ in.; pages 136. Illustrates and describes the company's line of Marsh steam pumps. The book is divided into nine sections, these dealing respectively with standard boiler feed pumps, tank and vacuum pumps, air compressors, deep well pumping engines, pumps for handling the hot water of condensation, pumps for sugar house work, Marsh sinking pumps, Marsh creamery pumps, and miscellaneous Marsh pumps. Descriptive matter pertaining to the setting up and running of Marsh steam pumps, their operation and their construction is given, with special emphasis laid on the patent self-governing steam valve and the fact that there is no outside valve gear. The catalogue also gives useful information, such as capacities of pumps in U. S. gallons, equivalent pressures due to columns of water from 10 to 400 ft. in hight, &c. The first page contains an alphabetical index.

Industrial Cars.—Arthur Koppel Company, 66 Broad street, New York. 1907 album. Illustrates some of the company's industrial cars, which are manufactured in all styles and for all purposes, showing them in operation at various places.

Gasoline Engines.—Clipper Lawn Mower Company, Dixon, Ill. Circular. Refers to the Clipper marine and stationary gasoline engines which the company began to manufacture last year from a design that it has been perfecting for about five years. It is described as the only engine that has a direct tube oiler running to the crank arm sleeve, which will prevent all cutting. The engine is made in single and double cylinder patterns, ranging from 2 to 8 hp.

Punches, Shears and Special Machinery.—Geo. Whiting Company, 156-164 West North avenue, Chicago. Catalogue No. 1. Size 8½ x 5 in.; pages 47. This is the first regular catalogue issued by this company and describes a complete line of punches, shears, bending rolls, belt power rivets and specially designed tools. A copy of specifications, outlining the character of workmanship, material and design used in the construction of all tools, is presented in the front pages of the catalogue and represents a high standard of quality that is especially desirable in tools of this class.

Conveying and Transmission Machinery.—Stephens-Adamson Mfg. Company; works, Aurora, Ill.; sales office, First National Bank Building, Chicago. Monthly bulletin, containing price-list and illustrations of double crimped wire screen, various sections of wire mesh; also revolving screens and conveying and unloading machinery for use in handling heavy material such as ore, stone, coal, cement and ashes.

Foundry Supplies and Equipment.—The S. Obermayer Company, Cincinnati, Ohio. March and April issue of the Obermayer Bulletin. Contains several articles upon special features of foundry practice. C. R. McGahey in the leading article describes the molding of floor pulleys, pointing out dangers to be avoided and showing what he regards to be the best methods of doing this work. In addition to the Query Box and Editorials there are articles dealing with the question of "Shrinkage and Contraction," "Where Should the Blame Rest," and "Foundry Practice."

Marine Machinery.—Marine Iron Works, Chicago, Ill. Catalogue No. 17. Size 6 x 9 in.; pages 84. Deals with a line of marine machinery, including light and heavy triple expansion, light and heavy compound, vertical tandem-compound, and light and heavy single and double cylinder engines; condensing apparatus; propeller wheels; stern paddle-wheel machinery; marine boilers, and accessory apparatus such as cut-off valves for stern paddle-wheel engines; steamboat whistles; steam siphons; capstans; deck, fire and test pumps; search lights; steering wheels; throttle valves, &c.

Lathes and Planers.—Pittsburgh Machine Tool Company, Allegheny, Pa. Six circulars. Devoted respectively to the company's 48-in. engine lathe, 32-in. double back geared lathe; 38-in. triple geared lathe, 27-in. double back geared lathe, 60-in. triple geared lathe, and the 32 x 32 in. and 32 x 36 in. planers. Each circular contains illustrations of the machines referred to, and the descriptive matter covers their operation, construction and general dimensions.

Water Columns.—Jarvis Engine & Machine Works, Lansing, Mich. Circulars. Deal with the Jarvis safety water column designed expressly for small boilers, but also adapted to boilers of any size. This safety water column blows for both high and low water, and can be attached to the shell of the boiler, to the water column or any other desirable point.

Ventilators.—Pullman Automatic Ventilator Mfg. Company, York, Pa. Pamphlet. This is entitled "Ventilation by the Pullman System," the principle of which is to provide openings at the top of the windows for the extraction of the foul air and at the bottom for the admission of fresh outside air direct, the Pullman automatic intake, and automatic exhaust being used for the purpose. The claim for this system is that it causes a complete diffusion and precludes drafts and in a large measure dust and foreign particles.

Iron Working Machinery.—Excelsior Tool & Machine Company, East St. Louis, Ill. Loose leaf pamphlet of circulars. These pertain to the company's line of iron working machinery, including an automatic multiple punching machine, Little Giant portable lever punch, geared gap squaring and double geared squaring shears, alligator shear, flanging machine, inside cutting machine, reversible shear, punch and press, deep throat punch press, steel ball-bearing casters with and without base, punches, lever shear, double reamer, crimping machine, riveting table, arch press, power press, combined punch and shear, scroll punch, twisting machine, tools and extra parts, and special hand forged tools. A list of users and reproductions of testimonials are given, and descriptions, shop hints, rules and other useful information are appended.

Telephone Systems and Electrical Apparatus.—Holtzer-Cabot Electric Company, Boston (Brookline), Mass. Pamphlets and bulletins. Pamphlets Nos. 148AA and 148AB describe the Ness automatic exchange extension intercommunicating telephone systems for offices, factories, schools, hospitals, residences, hotels, &c. Illustrations of the various types of wall and desk types of telephone are given, and also of the hand microtelephone, hotelephone, vestibulephone and central energy switchboard. Bulletin No. 202 A, superseding No. 202, is devoted to telephone receivers and cords, including the standard bi-polar and watch-case receivers, head receiver, double headband receiver, rubber air-cushion receiver caps, receiver cords and the H-C hand microtelephone. Bulletin No. 151A pertains to electric vibrating bells, and No. 305A, superseding No. 305, to small standard direct current power motors.

Machinery.—Standard Bridge Tool Company, Pittsburgh, Pa. Pamphlets. The subjects covered include the Thomas universal spacing table, a traveling gantry for light work, a light crane, a two-motor crane, a traveling gantry for heavy work, an angle chamfering and facing machine, roller tables for handling plates at punches, and motor trucks adapted for carrying long material and arranged for slow speed.

Rock Drills.—Ingersoll-Rand Company, 11 Broadway, New York City. Booklet 20A. Describes the new Temple-Ingersoll electric air drill. The drill is operated by compressed air furnished by a portable electrically driven compressor which is moved from place to place with the drill. This novel combination, it is claimed, completely solves the problem of employing electric current in driving rock drills by combining electrical economy and flexibility with air drill capacity and endurance, eliminating the conditions which make the successful employment of the electric drill impossible. The drill being air operated has special advantages of its own, especially in the increased force of the blow struck and the great saving of power.

* "The Ethics of Corporate Management," Chicago, March 10, 1906.

† Handley *v.* Stutz, 139 U. S. 147, and cases cited.

NEWS OF THE WORKS.

Iron and Steel.

Nittany Furnace at Bellefonte, Pa., which was out for repairs, has been lighted.

Very satisfactory records are being made at Lebanon Valley Furnace, Lebanon, Pa., it having exceeded its usual tonnage on several days this month. L. W. Richards is the new manager.

No. 7 furnace of the Thomas Iron Company, at Alburtis, Pa., has been blown out for repairs after a long campaign.

The Ohio Rail Company, Park Building, Pittsburgh, mills at Newark, Ohio, of which L. B. Foster is president, manufacturer of light rails, has let contracts for equipment, consisting of rolls, straighteners, a continuous heating furnace, breakers and drill presses. Work on the new plant is being pushed rapidly and it is expected to be in operation by June 1.

In addition to the contract for 10 blowing engines for equipment of its new plant at Aliquippa, Pa., placed some time ago with the Pittsburgh office of Allis-Chalmers Company, another order has been placed with the same company by the Jones & Laughlin Steel Company for two Allis-Chalmers direct current generators, each of 1000-kw. capacity, for installation in the same plant. The two new units are of the compound wound, engine type, to be used for supplying current for the variable power load common to the modern steel mill, where extensive use is made of electric motor drive for many purposes. These machines are wound for 250 volts and will be operated at a speed of 94 rev. per min.

The Eastern Steel Company, Pottsville, Pa., will place its new blooming mill in operation in about two weeks. This mill takes the place of the old one, but will have a larger capacity.

The Youngstown Sheet & Tube Company is adding a new cupola to its Bessemer plant at Youngstown, Ohio, which will be started this week and will considerably increase its output of steel. This company has recently built five more puddling furnaces.

General Machinery.

The Georgia Railway & Electric Company, Atlanta, Ga., has prepared plans for the erection of several new buildings, to include a machine shop, 68 x 98 ft.; addition to paint shop, 50 x 110 ft.; addition to the carpenter shop, and a new blacksmith shop. The plans also include the erection of a steel car barn, 102 x 258 ft., with a capacity of 50 cars.

F. A. Farnsworth, San Francisco, Cal., has severed his connection with the Farnsworth Electrical Works, of which he was president and general manager, and has gone into business on his own account at 16 and 18 Natoma street, where he carries a full line of new and second-hand motors, transformers, dynamos, centrifugal pumps, &c., for sale or rental. In addition a thoroughly equipped repair shop will be conducted.

The Moore Screen Company, Sandy Hill, N. Y., has changed its name to the Glens Falls Machine Works, it having been decided to erect a plant at Glens Falls, N. Y. The building, 115 x 175 ft., of steel and brick, with monitor center for accommodating a traveling crane, is expected to be ready for operation by July 1. The machine tool equipment was purchased from the Vandyck-Churchill Company, New York, which represents the American Tool Works Company of Cincinnati, Ohio, and the machines will be installed during June. The tools will be driven by individual motors, and those in the pattern shop will be grouped and motor driven. W. W. Wells is president, A. R. Paull vice-president, and Andrew Tromblee secretary and treasurer.

The recent fire in the engineering building of McGill University, Montreal, Canada, did not seriously injure the mechanical equipment, and it is not likely that any new machinery will be installed until the building is reconstructed. The power plant was not injured.

The Wheeling Mold & Foundry Company, Wheeling, W. Va., manufacturer of rolls, castings and rolling mill machinery, has installed a 20-ton Alliance electric crane in its machine shop and will put a 30-ton crane in its foundry. These additions to equipment have been made necessary by the large increase in business and also to permit handling materials more quickly and economically.

The McDermott Tool Works, Martins Ferry, Ohio, manufacturer of forgings and oil well tools, has purchased a Fifield engine lathe for its machine shop and will shortly add a 4000-lb. steam hammer.

I. F. Masson & Co., New Orleans, La., recently established themselves at 213-215 South Front street and 210-212 Fulton street, to handle machinery and mill supplies and also as workers in copper, tin and iron. The members of the firm were among the oldest of the employees of the late M. S. Logan Company, J. A. Reynolds, manager of I. F. Masson & Co., having been with the old concern for 20 years.

The Freeport Mfg. Company, Freeport, Ill., has recently been organized with a capital stock of $15,000, and will engage in the manufacture of machinery and gas engines. F. Dorman is president, A. G. Hoefer vice-president and Charles Hufford assistant superintendent.

The F. D. Rosback Company, Benton Harbor, Mich., builder of perforating, wire stitching and punching machines, is negotiating for a site upon which to erect a new factory. Details are not as yet obtainable, but it is the purpose to operate the new factory by electricity.

A new company has been incorporated with a capital of $10,000, under the name of the Oelwein Mfg. Company, Oelwein, Iowa, for the manufacture of gas engines and cement mixers.

The James Ohlen & Sons Saw Mfg. Company, Columbus, Ohio, which last year added 20,000 sq. ft. of floor space to its plant, is now building another addition thereto, which consists of a two-story fireproof structure, 125 x 140 ft. It is the purpose to equip the new building with machinery for the manufacture of hand and cross cut saws. The demand for saws has been constantly increasing and plans are already being prepared for the construction of additional buildings during the coming year, which space will be largely devoted to the manufacture of band saws.

The United Iron & Steel Company has placed a contract for the building of a new machine shop in connection with its blast furnace at West Middlesex, Pa.

Power Plant Equipment.

The Morton Light, Heat, Power & Water Company, Peoria, Ill., has been incorporated with a capital stock of $18,000, for the purpose of building a heat, light and water plant.

The Northern Boiler & Structural Works, Appleton, Wis., has been incorporated with a capital stock of $30,000, and will erect boiler and structural shops at Wausau, Wis.

Under a reorganization the Duquoin Ice & Cold Storage Company has changed its name to the Duquoin Utility Company, Duquoin, Ill., and has increased its capital stock to $100,000. The company will operate a water works and electric light plant. All necessary machinery has been purchased. The officers of the new organization are J. H. Ward, president; Robert O. Lehn, secretary and treasurer.

Orders received recently by the N. C. Davison Company, manufacturers' agents, Empire Building, Pittsburgh, include a 125-hp. Bessemer gas engine for installation in the plant of the J. S. McCormick Company, Pittsburgh; 20 and 50 hp. Bessemer gas engines belted to a 30-kw. generator for the Roseville Amusement Company, Sharon, Pa., and a Humphrey deep well pump.

The Public Works Commission of Hartsville, S. C., will receive bids until May 1 for the construction of a sewerage system and water works. There will be required for the water works steam pumps, electric pumps, three miles of cast iron mains and other material.

The Board of Public Works of Fort Wayne, Ind., will receive bids until June 12 for the construction of a municipal electric light plant to cost about $160,000. Plans and specifications for the installation of the plant will be completed about May 1.

The reports of the fire at the power plant of the San Francisco Gas & Electric Company, San Francisco, Cal., were very much exaggerated, the damage being confined to the roof of the building. The machinery was not damaged.

Foundries.

We are officially advised that the report that the Carnegie Steel Company would build a large foundry at the Ohio Works, Youngstown, Ohio, to make castings, ingot molds and ladles, is untrue. There is no intention of building a foundry at this works for the present at least.

The Hildreth Mfg. Company, Lansing, Mich., manufacturer of marine engines and gray iron castings, which has just about completed the erection of a new foundry, containing 18,000 sq. ft. of floor space, finds that it is not large enough to take care of its business, and is now contemplating the building of a wing to contain 10,000 sq. ft. of additional floor space. The foundry is being equipped with modern machinery.

The Amsler Engineering Company, Pittsburgh, has received a contract for the building of an annealing furnace, two drying ovens and one core oven for the Shull Steel Casting Company, Canton, Ohio.

The Galion Iron Works, Galion, Ohio, manufacturer of cast iron culvert pipe and general founder, has purchased a site of about 5 acres, situated in the southern part of that city at the junction of the Big Four and Erie railroads, upon which it will erect its plant. The main building will be 60 x 200 ft., and in addition there will be a power plant building, cupola room, storage sheds, &c. It is expected that contracts will be placed in a few days for the equipment, which will consist of cupola, jib crane, traveling crane, trolleys, gas engines, blower, industrial cars and other foundry apparatus. The company has had its culvert pipe on the market for the past three years, having had it manufactured under contract in an outside foundry.

The Trumbull Mfg. Company has begun work on extensive improvements and additions to its foundry at Warren, Ohio. A new 24 x 100 ft. storehouse, a coreroom 14 x 20 ft., core oven 16 x 20 ft. and an engine room 20 x 20 ft. are to be erected. A new gas plant is to be installed to furnish motive power for the foundry and machine shop.

Bridges and Buildings.

The City of Scranton will shortly ask bids for the construction of five steel bridges. A bond issue of $200,000 is about to be made for the purpose.

Proposals are asked by the County Commissioners of Wyandot County, Upper Sandusky, Ohio, for two steel bridges, one 78 ft. 6 in. span and one 131 ft. 6 in. span. Bids should be submitted on or before May 3 for the former and May 10 for the latter.

The War Department has awarded contract to the department of general contracting of the Standard Engineering Corporation, Philadelphia, Pa., for the erection of shops at the Sandy Hook proving grounds. These include a machine shop, 50 x 325 ft., of slow burning construction, equipped for gun repair work; plumbing, carpenter and paint shop, 50 x 175 ft.; power house, 50 x 150 ft., to be equipped with Smith boilers, Ball engines, Crocker-Wheeler generators and Walker switchboard. The Cryer system of low pressure steam heating is to be installed throughout. The Standard Engineering Corporation has considerable work on hand, including an extensive paper mill, which will no doubt be constructed this summer, electric equipment of several Government boats, and the modernization and equipment with motor drives of two large plants.

The Locomotive & Machine Company, Montreal, Canada, having decided to retire from the bridge and structural business, has sold its stock of material, the equipment of its bridge and structural shop, and has leased the building and surrounding land to the Dominion Bridge Company. The bridge and structural department is separate from the company's locomotive shops.

Fires.

The can manufacturing plant of the American Can Company, Lubec, Maine, was destroyed by fire April 22, with loss of $250,000.

The Robertson Machinery Company's foundry and machine shop at Welland, Ont., were damaged by fire April 19.

The manufacturing plant of the Pennsylvania Ice Company, Cresson, Pa., was destroyed by fire April 20.

Hardware.

The capital stock of the Brooks Tire Machine Company, Wichita, Kan., has been increased from $100,000 to $150,000. Owing to the rapid development of the business and the large demand for tire machines, which has notably increased in the East, the company is now contemplating the establishment of a manufacturing plant at some convenient Eastern center, or the making of arrangements for the manufacture of its product in Eastern territory.

The Mattatuck Mfg. Company, Waterbury, Conn., manufacturer of furniture nails, is adding a story to its present building, giving 45 x 145 ft. of new floor area. The space will be occupied for the manufacture of the present line, the business having increased to such an extent during the past two or three years that the company is cramped for room.

The Pilling Brass Company, Waterbury, Conn., has been incorporated in Connecticut with paid in capital of $15,000. J. W. Pilling is president and treasurer and J. L. Sweiger secretary, J. H. Spilling being the third director. The company will manufacture brass, German silver and copper, 6 in. and narrower and 0.005 in. and thicker. The plant is already in operation.

The A. D. Howe Machine Company, Wheeling, W. Va., which has been operating a general machine shop for some years, has perfected and placed on the market a motor driven washing machine in which some new and novel features are incorporated. Its factory is equipped with the latest improved machinery for turning out these machines.

A. C. Dinkey, president of the Carnegie Steel Company, and other officials of that corporation have bought the plant of the Reno Brothers Paint Company, at Pulaski, Pa.

The Munnsville Plow Company, Munnsville, N. Y., has recently built a new foundry with more than double the capacity of the old one. It has been equipped with the most modern machinery, so that the company is in a position to work to the best advantage. The company reports that its highway culverts of iron are meeting with a demand that is crowding the productive capacity to the limit.

John S. Tilley, Watervliet, N. Y., manufacturer of ladders and stepladders, adjustable scaffolding jacks for interior staging, swing stagings, ladder hooks and brackets, flag poles, &c., has recently doubled his manufacturing capacity owing to the large increase in his business.

The Harrington Cutlery Company, Southbridge, Mass., announces that beginning April 29 its works will go on a 55 hour a week basis, consisting of 10 hours a day, with a Saturday half holiday. The American Optical Company, of the same town, will adopt a similar permanent schedule, beginning May 2.

Edgar A. Weimer, Asa A. Weimer and George E. Holly of Lebanon, Pa., have organized the Lebanon Valley Chain Company and will ask for a State charter to manufacture chains, forgings, steel castings, &c. The company has purchased a tract of land east of Lebanon and has staked off sites for new buildings.

Miscellaneous.

The Memphis Iron & Metal Company, 260 North Front street, Memphis, Tenn., has been incorporated, with a capital stock of $18,000, to do a wholesale business in scrap iron and junk.

The Manufacturers' Plant & Power Company, incorporated at South Bend, Ind., with $100,000 capital stock, has purchased the former buildings of the Singer Sewing Machine Company and will arrange them for lighter manufacturing purposes. The directors are Albert B. Wickizer, Philip E. Bondurant, Clinton A. Bondurant, Stephen A. Knoblock and Chas. M. Kriegbaum.

The Ecklebarger Individual Gas Plant Company has been incorporated at Goshen, Ind., with $15,000 capital stock, to manufacture gas plants, appliances, &c. The directors are Zena Ecklebarger, Harlan A. Stauffer and Daniel M. Bowser.

The Greene Railroad Safety Device Company has been incorporated at Buffalo, N. Y., with a capital stock of $500,000, to manufacture railroad safety switches and other railroad track devices the inventions of Ernest F. Greene of Silver Creek, N. Y. The safety switch device automatically closes and locks for the main line track any facing point switch left open by carelessness or design by tripper on front of locomotive. The company has made temporary arrangements for factory space to enable it to get out trial orders for several railroads, and expects to locate and equip a permanent factory at Buffalo later. Mr. Greene is manager, and the offices are at 606-607 White Building.

James McNeill & Brothers, Pittsburgh, have secured a contract for 4 miles of steel riveted pipe for a new water works at Seattle, Wash.

The McAuley Automatic Trap Company, Pittsburgh, was recently awarded the contract for the steam trap equipment for the extension to the Clairton plant of the Carnegie Steel Company and for the new Carrie furnaces; also orders for steam traps for the Long Island City Railroad, the Midland Steel Company, Colonial Steel Company and the Cambria Steel Company.

The Corn Products Company, New York, which uses large quantities of tin cans, has decided to erect a plant to manufacture its own cans. Plans have been completed for the plant, which will probably be erected at Granite City, Ill., where one of the company's syrup factories is located. About $300,000 will be spent in installing the plant, the machinery for which has been ordered.

The Paterson Brass Foundry, Paterson, N. J., has incorporated, with a capital stock of $25,000, to manufacture brass castings and metals for special requirements, including bronze, Babbitt, composition and aluminum castings. The general office is at 42 Van Houten street, Paterson, and the New York office at 10 Wall street. P. O. Dixon is president; Samuel Hart, vice-president and general manager, and O. O. Dixon, secretary and treasurer.

Some time ago the Seattle Car Mfg. Company, Seattle, Wash., of which William Pigott is president, purchased a large tract of land upon which it is to erect a new plant for the manufacture of freight and passenger cars. The plans call for a foundry, 75 x 80 ft.; blacksmith shop, 75 x 180 ft.; machine shop, 175 x 200 ft.; erecting shop, 100 x 250 ft.; wood shop, 75 x 175 ft.: power house, 50 x 60 ft. ; office and storage buildings and paint room.

The J. G. Brill Company, Philadelphia, Pa., whose brass foundry was recently damaged by fire, will not require any new machinery as the equipment was not destroyed.

The Merrill-Stevens Company, Jacksonville, Fla., now has its dry dock in full operation. This dock will accommodate vessels of considerable size.

The Edwards Electric Headlight Company, La Porte, Ind., has been placed in the hands of a receiver, but will continue operations for a time at least in order to work up stock on hand. The company was capitalized for $250,000, and in addition to the manufacture of electric headlights for locomotives built gas and gasoline engines. According to the estimates of the receiver the assets of the company will be sufficient to pay its indebtedness in full, or nearly so.

Burroughs & De Blois, 28 Kilby street, Boston, agents, are to erect an eight-story brick factory building, 105 x 200 ft., on Charlestown near Causeway street, next to Boston Harbor.

A charter has been granted to Rogers & Co., Royersford, Pa., to manufacture fire brick, cupola linings, &c. H. C. Saylor and W. L. Latshaw, Royersford, and Harry U. Rogers, Spring City, are the incorporators.

The plant of the Williamsport Clutch & Pulley Company, Williamsport, Pa., has been sold at receiver's sale to S. N. Williams.

At the annual meeting of the stockholders of the Joseph Dixon Crucible Company, Jersey City, N. J., the old board, consisting of Edward F. C. Young, John A. Walker, Edward L. Young, William Murray, George T. Smith, Joseph D. Bedle and George E. Long, was unanimously re-elected. The Board of Directors re-elected the former officers, as follows: E. F. C. Young,

president: John A. Walker, vice-president and treasurer; George E. Long, secretary.

The Wadesboro Electrical Mfg. Company, Wadesboro, N. C., has been organized with a capital stock of $100,000 for the manufacture of insulator pins, cross arms, brackets and other electrical supplies. A plant is being equipped.

The Gearless Transmission Company, Buffalo, N. Y., recently incorporated, has secured a plant which it has equipped for the manufacture of automobiles. Julius Jackson is president; John W. Breyfogle, vice-president and treasurer; Burton M. Kinsman, secretary, and George D. Wilcox, general manager.

The Pneumatic Caisson Company, Troy, N. Y., recently incorporated with a capital stock of $200,000, has been licensed to use the patents on concrete steel pneumatic caissons owned by the American Concrete Caisson Company, Troy, in the larger part of the United States. The company will undertake contracts for general foundation work, making a specialty of pneumatic caisson work, and already has one contract on which 12 concrete steel pneumatic caissons will be used. Oliver C. Edwards is president; Hugh C. Leibee, acting secretary, and Henry Coldin, treasurer.

Among large orders recently received by the Wm. B. Scaife & Sons Company, Pittsburgh, for installation of the Scaife patented pressure filter systems are the following, in gallons per day: City of Humboldt, Kan., 750,000; St. Lawrence Water Company, Massena, N. Y., 1,000,000; Pennsylvania Glue Company, Springdale, Pa., 500,000; Cheney Bros., South Manchester, Conn., 1,000,000; Lewis Foundry & Machinery Company, Groveton, Pa., 250,000; Susquehanna Silk Mills, Sunbury, Pa., 500,000; Russia Cement Company, Gloucester, Mass., 250,000; Troy Laundering Company, Columbus, Ohio, 350,000; Christ Diehl Brewing Company, Defiance, Ohio, 200,000; C. L. Centlivre Brewing Company, Fort Wayne, Ind., 150,000.

The Hartville Iron Range, Wyoming.

WASHINGTON, D. C., April 23, 1907.—An exhaustive study of the interesting iron ore deposits of the Hartville iron range has been made by Sidney H. Ball of the United States Geological Survey, and the results are embodied in a brief report in which are presented a description of the ore bodies and the recent development by the Colorado Fuel & Iron Company.

Location of Deposits.

The Hartville iron range, lying north and east of the North Platte River, is situated in Laramie County, in east-central Wyoming. It forms a portion of the Hartville uplift, a broad and low domal mountain mass similar in many respects to the Black Hills in South Dakota. The maximum hight of the uplift is about 6000 ft. above sea level. The climate is semiarid, and in consequence timber is confined to the higher peaks. Lower elevations are covered sparsely by bunch grass, cactus and low desert shrubbery. The iron range extends from Guernsey to Frederick, a distance of 8 miles. The iron bearing rocks reach a maximum exposed width of 3 miles. The productive area is, however, considerably smaller and extends from Sunrise northeastward 2 miles, and from the same point southeastward 1 mile. The towns of the iron range are Sunrise, Hartville, Ironton and Guernsey. The principal mine of the range and the local offices of the Colorado Fuel & Iron Company are at Sunrise, a village having a population of 1500. Hartville, a town of 150 people, is supported by the miners of Sunrise. Ironton is the mining camp of the Chicago mine. Guernsey is an ore shipping town of 150 people. The Hartville iron range has two railroads. The Colorado & Wyoming Railroad extends from the Colorado & Southern Railroad at Hartville Junction to Sunrise, and is the line by which the Sunrise ore is shipped; the Chicago, Burlington & Quincy Railroad has built a branch from its present terminus at Guernsey to the Chicago mine.

The history of the Hartville iron range may be divided into four periods: 1. That during which the Indians mined soft ore for war paint. 2. A period stretching from 1880 to 1887, during which the range was a copper mining district. 3. An iron prospecting period extending from 1888 to 1897. 4. The period of productive mining, from 1898 to the present day. The value of the iron deposits of the Hartville iron range was proved while copper was being mined at Sunrise. With the exhaustion of the copper deposits, I. S. Bartlett and C. A. Guernsey began to prospect for iron ore, and in 1900 Mr. Guernsey, having segregated most of the larger deposits, sold his group of claims to the Colorado Fuel & Iron Company. Since that time this company has been adding to its holdings, and now controls most of the more valuable claims. It is rapidly developing two mines, the Sunrise and Chicago, which now furnish the greater portion of the ore used in its furnaces at Pueblo, Colo. The production of the range is tabulated below:

Year.	Mine.	Gross tons.
1898-99	Good Fortune mine	30,000
1900	Sunrise mine	73,663
1901	Sunrise mine	134,161
1902	Sunrise mine	209,272
1903	Sunrise mine	214,880
1904	Sunrise and Chicago	135,167
1905	Sunrise and Chicago	474,545

In 1905 the Sunrise mine was in point of production the twentieth iron mine in the United States, but two mines outside of the Lake Superior region exceeding it in output. The product of the range shows an encouraging increase, which will presumably become greater from year to year.

The ore of the range is a high grade hematite, some masses of which contain over 68 per cent of iron, although the ore as a whole will probably not average over 60 per cent. The iron content in the Sunrise mine increases perceptibly with depth, indicating, perhaps, a considerable redeposition of iron at depths through secondary processes. The ore of the Hartville iron range examined by early writers was very low in phosphorus, many samples showing only a trace. At the present time much of the ore shipped is of a non-Bessemer grade. The earlier analyses are believed by the officers of the Colorado Fuel & Iron Company to have been made from picked samples, since their analyses from the same points show a higher content of phosphorus. Some of the ore is high in silica, its only other detrimental constituent. Sulphur, so far as known, is absent, while the copper minerals occupy such restricted areas that their presence is not troublesome in the sorting of the ores.

Distribution.

The iron ore lenses all occupy similar positions in relation to the inclosing rocks. They lie in schist immediately above the uppermost limestone of the older pre-Cambrian series. This limestone swings from the Good Fortune mine east to Whalen Canyon, where it is covered by alluvium. Since limestone does not outcrop on the east side of Whalen Canyon, south of this point the contact is perhaps situated near the center of the valley. In the other direction the contact courses from the Good Fortune mine north of west to a point where it passes beneath horizontal carboniferous rocks. The contact between the schist and limestone in this direction is again exposed in the Republic shaft at the tail of the railroad Y in Sunrise. From here it courses to a point beneath the Colorado supply store, from which it goes north and then northeast, forming the foot wall of the Sunrise ore body. Thence it bows out to the westward, passing north of the Biwabik shaft beneath the Carboniferous, and appearing at the surface again 100 ft. north of the Chicago open pit. The contact here is hidden in a valley, but appears again on the hill west of the Colorado supply store at Ironton. After passing beneath the alluvium of Whalen Canyon this contact next appears in a hill south of the house at Kline's ranch. From this point it courses practically due north to Frederick, where it lies slightly east of the ranch house. The presence of large ore bodies is determined apparently by the minor structural peculiarities of this contact.

In the early days of mining at Sunrise the surface was covered by boulders of iron ore, which were derived from the breaking down of the pre-Cambrian iron ore body at that point. Although large amounts of this ore have been shipped, iron ore float even now occurs throughout the productive portions of the iron range. Pebbles of iron ore are found in the bed of Platte River some distance below the town of Guernsey. At Guernsey they are 1 in. or less in diameter and increase gradually in size up stream. The pebbles do not occur in the Platte above the mouth of Hartville Canyon, but are found in the canyon as far up as Sunrise. W. L. C.

The Iron and Metal Trades

While Pittsburgh reports further large transactions in Bessemer Pig for delivery during the second half at an advance of $1 a ton, the volume of business in Steel making Irons in other sections of the country is on a very small scale.

In the territory east of the Allegheny Mountains there is practically a deadlock, although the Steel works have only covered a very moderate part of their requirements for the second half.

Large consumers in the Foundry trade seem to be chiefly engaged in manœuvering for position. Outside of one interest in the New York District, which has purchased an aggregate of about 20,000 tons during the last three weeks, large inquiries are still pending either in whole or in part, and a good deal of mystery is maintained. One feature in the situation is the advance abroad to 56 shillings 9 pence for No. 3 Middlesbrough warrants, and the report emanates from excellent sources that purchases for American account of warrants to the extent of 50,000 tons have been made. It remains to be seen whether the Iron will be actually shipped. On the basis of warrant prices ruling to-day Middlesbrough Iron cannot be laid down at less than $20.25 duty paid, cost, and $21 ex ship is being asked. Even then foreign Iron is selling considerably below domestic for early deliveries, and the foreign metal can penetrate pretty far inland.

Steel continues very scarce. A leading Steel interest has purchased some round lots, both from a Steel plant on the Ohio River and from a works in the Buffalo District, to be used chiefly by Wire mills.

The Pennsylvania inquiry for Rails for 1908 aggregates 153,000 tons, against about 170,000 tons for 1907, with the usual option of taking a certain percentage above or below the quantity named.

As yet no advices have been received concerning 1908 sales from the West, where the movement is expected to develop first. For 1907 delivery sales have been light, the only large transaction having been 4500 tons for the New Orleans & Eastern.

A constant flow of new business is coming to the Structural mills. A Pittsburgh fabricator has secured 5000 tons for the extensions of the Pittsburgh Steel Company, and an additional 1000 tons was placed for San Francisco. Chicago reports that there are pending 9000 tons of Bridge work and 3500 tons for a building at Indianapolis, while in the East the New Haven road needs further tonnage for the Harlem extension.

The Bar trade is active, although thus far only a moderate part of the season requirements of the implement makers has been placed. They are still holding off in the hopes of securing special concessions.

The volume of business in the Merchant Pipe trade is very heavy. A large mill in the Youngstown District withdrew quotations on the 22d and has advanced prices $2 per ton. Efforts on the part of Pipe makers to secure round lots of Iron Skelp have been unsuccessful thus far.

Large orders for the second half are being placed with the Tin Plate mills.

The Cast Iron Pipe foundries are doing a very fair business. Among the contracts pending are 6100 tons for St. Louis, 2500 tons for Cincinnati and 2500 tons for Los Angeles.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Apr.24, 1907.	Apr.17, 1907.	Mar.27, 1907.	Apr.25, 1906.
PIG IRON, Per Gross ton:				
Foundry No. 2, Standard, Philadelphia	**$24.50**	$24.50	$24.25	$18.50
Foundry No. 2, Southern, Cincinnati	*24.75*	24.75	26.00	16.75
Foundry No. 2, Local, Chicago	26.00	26.00	26.00	18.75
Bessemer, Pittsburgh	**23.85**	23.35	22.85	18.10
Gray Forge, Pittsburgh	**21.85**	21.85	21.60	16.60
Lake Superior Charcoal, Chicago	26.50	26.50	26.50	19.25
BILLETS, &c., Per Gross Ton:				
Bessemer Billets, Pittsburgh	**30.50**	30.00	29.00	27.00
Forging Billets, Pittsburgh	36.00	36.00	36.00	32.00
Open Hearth Billets, Phila	32.00	31.50	32.00	29.00
Wire Rods, Pittsburgh	37.00	37.00	37.00	34.50
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross ton:				
Steel Rails, Melting, Chicago	18.00	18.00	18.00	14.00
Steel Rails, Melting, Phila	*19.00*	19.00	19.25	17.25
Iron Rails, Chicago	*24.50*	25.00	25.00	21.25
Iron Rails, Philadelphia	27.00	27.00	27.00	21.50
Car Wheels, Chicago	**25.00**	25.00	24.00	19.00
Car Wheels, Philadelphia	24.00	24.00	24.00	16.75
Heavy Steel Scrap, Pittsburgh	*17.75*	18.00	18.00	15.00
Heavy Steel Scrap, Chicago	*15.50*	15.50	16.00	13.50
Heavy Steel Scrap, Philadelphia	18.75	19.00	18.75	16.75
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia	*1.83½*	1.93½	1.93½	1.63½
Common Iron Bars, Chicago	*1.76½*	1.81½	1.81½	1.66½
Common Iron Bars, Pittsburgh	1.80	1.80	1.80	1.50
Steel Bars, Tidewater, New York	1.74½	1.74½	1.74½	1.64½
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.50
Tank Plates, Tidewater, New York	1.84½	1.84½	1.84½	1.74½
Tank Plates, Pittsburgh	1.70	1.70	1.70	1.60
Beams, Tidewater, New York	1.84½	1.84½	1.84½	1.84½
Beams, Pittsburgh	1.70	1.70	1.70	1.70
Angles, Tidewater, New York	1.84½	1.84½	1.84½	1.84½
Angles, Pittsburgh	1.70	1.70	1.70	1.70
Skelp, Grooved Steel, Pittsburgh	*1.85*	1.85	1.90	1.57½
Skelp, Sheared Steel, Pittsburgh	*1.90*	1.90	2.00	1.60
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, No. 27, Pittsburgh	2.50	2.50	2.50	2.25
Wire Nails, Pittsburgh	2.00	2.00	2.00	1.85
Cut Nails, Pittsburgh	2.05	2.05	2.05	1.80
Barb Wire, Galv., Pittsburgh	2.45	2.45	2.45	2.30
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake Copper, New York	*25.00*	24.50	25.25	18.62½
Spelter, New York	*6.75*	6.80	6.85	6.05
Spelter, St. Louis	*6.60*	6.65	6.65	6.05
Lead, New York	*6.10*	6.12½	6.25	5.50
Lead, St. Louis	*5.95*	5.95	6.05	5.40
Tin, New York	**42.00**	40.50	40.35	39.80
Antimony, Hallett, New York	*23.00*	22.00	23.00	21.00
Nickel, New York	45.00	45.00	45.00	40.00
Tin Plate, 100 lb., New York	$4.09	$4.09	$4.09	$3.79

Chicago.

FISHER BUILDING, April 24, 1907.—(*By Telegraph.*)

Whatever may be the differences of opinion as to the probable conditions of trade and range of prices in the more or less distant future, there is certainly no question to be raised respecting the present existence of a remarkable degree of strength and firmness in practically all departments of the Iron and Steel market. There is no lagging of specifications or contracts for finished material, and the amount of new business coming forward, while somewhat restricted from some sources, shows a volume that is not in the least disappointing. Users of Steel Bars are buying freely, though implement makers are generally holding back, influenced as much, or more, perhaps, by unsettled crop prospects as by distrust of stability of prices. Continued backward deliveries have resulted in higher store prices for Blue and Box Annealed Sheets of all gauges, and though similar advances on Plates were in contemplation no such action has yet been taken. Instead of relaxation following the very meager buying of Pig Iron that for the past two weeks has been a conspicuous feature of the market, the furnaces have stiffened as respects prices on last half tonnage. While the minimum quotation of $18.50, Birmingham, has not been advanced, there is less tonnage available at that figure than heretofore. One of the largest Southern producers is sold up closely through the third and is now offering nothing but fourth quarter delivery. Others have practically withdrawn from the market and are still holding for $19, although the situation in Pig Iron is one the final outcome of which it would be hazardous to predict.

Pig Iron.—The only features of significance that tend in any way to alter conditions noted last week are an increased number of inquiries of a firmer character, and a decidedly stronger attitude on the part of sellers as to last half tonnage. No quotations or sales are now reported at better than $18.50, Birmingham, for the four last half, or $19 for third quarter. One interest reports inquiries aggregating 20,000 tons now in hand, but so far but a small part of this tonnage has been placed. Last week's sales included one lot of 2100 tons of No. 2 Foundry, which was placed for deliveries extending through the entire second half at $18.50, Birmingham. Another lot of 1000 tons of Northern No. 2 Foundry was booked for nearby delivery at $26.60, Chicago. For last half delivery this grade is sold at $24.50 to $25, and Malleable Bessemer for the same period is quoted at $24, Chicago. The demand for spot Iron is light, but on what is moving prices are maintained at $22.50 to $23, Birmingham. The large amount of delayed shipments received and still coming forward will provide supplies for many melters through July, and will delay by that much the necessity for future buying. The strength of the present market rests upon the belief shared alike by sellers of both Northern and Southern Irons that if melters' requirements for the remainder of the year are anything like as great as estimated they will overreach the limit of furnace production. Entering into this question, however, is the possible restrictive effect upon the consumptive demand of advances in the price of melters' products that must follow the maintenance of the present or higher prices. The following quotations are for May and June shipments, f.o.b. Chicago:

Lake Superior Charcoal	$26.50 to $27.00
Northern Coke Foundry, No. 1	26.50 to 27.00
Northern Coke Foundry, No. 2	26.00 to 26.50
Northern Coke Foundry, No. 3	25.50 to 26.00
Northern Scotch, No. 1	26.00 to 27.00
Ohio Strong Softeners, No. 1	26.00 to 26.50
Ohio Strong Softeners, No. 2	25.50 to 26.00
Southern Coke, No. 1	26.35 to 27.10
Southern Coke, No. 2	25.85 to 26.35
Southern Coke, No. 3	25.35 to 25.85
Southern Coke, No. 4	24.85 to 25.35
Southern Coke, No. 1 Soft	26.35 to 26.85
Southern Coke, No. 2 Soft	25.85 to 26.35
Southern Gray Forge	21.85 to 22.35
Southern Mottled	21.85 to 22.35
Malleable Bessemer	26.50 to 27.00
Standard Bessemer	25.30 to 25.80
Jackson Co. and Kentucky Silvery, 6 %	30.30 to 30.80
Jackson Co. and Kentucky Silvery, 8 %	32.30 to 32.80
Jackson Co. and Kentucky Silvery, 10 %	34.30 to 34.80

Metals.—Locally, conditions show but little change save that some reaction is noted in the way of a better demand for Copper. Prices throughout the list remain unchanged save for a slight advance in Pig Tin. We quote as follows: Casting Copper, 25½c. to 26c.; Lake, 26c. to 26½c., in car lots for prompt shipment; small lots, ¼c. to ⅜c. higher; Pig Tin, car lots, 41½c.; small lots, 42¼c.; Lead, Desilverized, 6.50c. to 6.60c., for 50-ton lots; Coroding, 7.25c. to 7.35c., for 50-ton lots; on car lots, 2¼c. per 100 lb. higher; Spelter, 7¼c.; Cookson's Antimony, 28½c., and other grades, 26½c. to 27½c.; Sheet Zinc is $8.60 list, f.o.b. La Salle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 18¼c.; Heavy Copper Wire, 18c.; Copper Bottoms, 18c.; Copper Clips, 17½c.; Red Brass, 17c.; Red Brass Borings, 15½c.; Yellow Brass, 15c.; Yellow Brass Borings, 13¾c.; Light Brass, 12c; Lead Pipe, 5c.; Tea Lead, 4¾c.; Zinc, 4¾c.; Pewter, No. 1, 25c.; Tin Foil, 31½c.; Black Tin Pipe, 27½c.

(By Mail.)

Billets and Rods.—The situation as respects the limited amount of tonnage offered in the open market for both Billets and Rods is unchanged. Rods are still quoted at $37 to $39, Pittsburgh, for prompt delivery. A sale of 50 tons of Forging Billets, 8 x 2¾ in., is reported at $38, Chicago, which is regarded as the minimum quotation applicable to current transactions, upon which advances are asked according to size.

Rails and Track Supplies.—An active inquiry for Traction Rails is noted, and one sale of 1000 tons of high grooved section is reported. Light Rails and Track Supplies are in fair demand. There is some inquiry for Standard Section Rails, but no deals of importance have developed. We quote as follows: Angle Bars, accompanying Rail orders, 1907 delivery, 1.65c.; car lots, 1.90c. to 1.95c.; Spikes, 2.35c. to 2.45c., according to delivery; Track Bolts, 2.65c. to 2.75c., base, Square Nuts, and 2.80c. to 2.90c., base, Hexagon Nuts. The store prices on Track Supplies range from 0.15c. to 0.20c. above mill prices. Light Rails, 30 to 45 lb. sections, $35; 25-lb., $36; 20-lb., $37; 16-lb., $38; 12-lb., $39, f.o.b. mill. Standard Sections $28, f.o.b. mill, full freight to destination.

Structural Material.—No halt is apparent either in the steady inflow of specifications or the satisfactory development of new business. It is expected that about 9000 tons of Bridge Material will be in the market for figures within a week or two. Plans of the Merchants National Bank Building, Indianapolis, involving 3500 tons of Structural Material, are now in contractors' hands for bids. A large number of smaller building jobs, which aggregate a considerable tonnage, are in the market. Prices from store are quoted without change, at 2.05c. to 2.10c., and mill prices are as follows: Beams and Channels, 3 to 15 in., inclusive, 1.86½c.; Angles, 3 to 6 in., ¼-in. and heavier, 1.86½c.; larger than 6 in. on one or both legs, 1.96½c.; Beams, larger than 15 in., 1.96½c.; Zees, 3 in. and over, 1.86½c.; Tees, 3 in. and over, 1.91½c., in addition to the usual extras for cutting to extra lengths, punching, coping, bending and other shop work.

Plates.—As far as mill deliveries are concerned there is no change. The leading interest is practically sold up for the entire year, and other mills still quote premium prices for anything they are able to ship. Jobbers are receiving unusually large tonnage orders from stock, on which quoted prices are firmly held. The established mill price of 1.70c., Pittsburgh, though unchanged, is nominal and not available for nearby deliveries. We quote for future delivery as follows: Tank Plate, ¼-in. and heavier, wider than 6¼ and up to 100 in. wide, inclusive, car lots, Chicago, 1.86½c. to 2.06½c.; 3-16 in., 1.96½c. to 2.16½c.; Nos. 7 and 8 gauge, 2.01½c. to 2.21½c.; No. 9, 2.11½c. to 2.31½c.; Flange quality, in widths up to 100 in., 1.96½c. to 2.06½c., base, for ¼-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.96½c. to 2.16½c.; Flange quality, 2.06½c. Store prices on Plates are as follows: Tank Plate, ¼-in. and heavier, up to 72 in. wide, 2.20c. to 2.30c.; from 72 to 96 in. wide, 2.30c. to 2.40c.; 3-16 in., up to 60 in. wide, 2.30c. to 2.40c.; 72 in. wide, 2.5c. to 2.65c.; No. 8, up to 60 in. wide, 2.35c. to 2.45c.; Flange and Head quality, 0.25c. extra.

Sheets.—Mill order books still show congestion that has not been materially lessened. The resultant drain upon jobbers' stocks, which is the only source for prompt requirements, has produced a scarcity in nearly all grades and sizes. Minimum store prices have in consequence been advanced $5 a ton on Blue Annealed and $2 a ton on Box Annealed Sheets. We quote mill shipments as follows: Blue Annealed, No. 10, 2.01½c.; No. 12, 2.06½c.; No. 14, 2.11½c.; No. 16, 2.21½c.; Box Annealed, Nos. 17 to 21, 2.51½c.; Nos. 22 to 24, 2.56½c.; Nos. 25 and 26, 2.61½c.; No. 27, 2.66½c.; No. 28, 2.76½c.; No. 29, 2.86½c.; No. 30, 2.96½c.; Galvanized Sheets. Nos. 10 to 14, 2.81½c.; Nos. 15 and 16. 3.01½c.; Nos. 17 to 21, 3.16½c.; Nos. 22 to 24, 3.31½c.; Nos. 25 and 26, 3.51½c.; No. 27, 3.71½c.; No. 28, 3.91½c.; No. 30, 4.41½c.; Sheets from store: Blue Annealed, No. 10, 2.50c.; No. 12, 2.55c.; No. 14, 2.60c.; No. 16, 2.70c.; Box Annealed, Nos. 18 to 21, 2.80c.; Nos. 22 to 24, 2.85c.; No. 26, 2.90c.; No. 27, 2.95c.; No. 28, 3.05c.; No. 30, 3.45c.; Galvanized from store: Nos. 10 to 20, 3.30c. to 3.35c.; Nos. 22 to 24, 3.55c. to 3.60c.; No. 26, 3.65c. to 3.70c.; No. 27, 3.85c. to 3.95c.; No. 28, 4.15c.; No. 30, 4.65c. to 4.70c.

Bars.—Sales of Steel Bars for the past week have been extremely heavy. One large interest reports its bookings to have been much heavier than for many weeks. A number of transactions involving round tonnage lots have been closed. General buying by the implement interests has not begun, though some orders for deliveries running through to July, 1908, are reported. Prices on Steel Bars are firmly maintained. Quotations are as follows: Steel Bars, 1.76½c., with half extras; Iron Bars, 1.76½c. to 1.81½c.; Hoops, 2.16½c., extras as per Hoop card; Bands, 1.76½c., as per Bar card, half extras; Soft Steel Angles and Shapes, 1.86½c., half extras. Store prices ars as follows: Bar Iron, 2.10c. to 2.25c.; Steel Bars, 2c. to 2.10c.; Steel Bands, 2c., as per Bar card, half extras; Soft Steel Hoops, 2.35c. to 2.45c., full extras.

Merchant Pipe.—With the demand as strong as ever and no marked relief from the scarcity existing there is no appreciable change in the situation. It is true that progress is being made by the National Tube Company's mills in clearing up accumulated orders since the booking of new business has been suspended, but this affords no immediate relief to new business coming forward. No change in prices is reported, which on base sizes are quoted as follows: Black Steel Pipe, ¾ to 5 in., 72.35; Galvanized, 62.35, carload lots, Chicago. From store in small lots, Chicago jobbers quote 70 per cent. on Black Steel Pipe, ¾ to 6 in. About 4 points advance above these prices is asked for Iron Pipe.

Boiler Tubes.—Order books are still too far crowded with forward engagements for mills generally to make satisfactorily prompt deliveries. The demand for Merchant Tubes is good, and is especially strong for shipment from jobbers' stocks. Mill quotations for future delivery on the base sizes are as follows: 2¾ to 5 in., in carload lots, Steel Tubes, 63.35; Iron, 50.35; Seamless, 49.35; 2½ in. and smaller, and lengths over 18 ft., and 2½ in. and larger, and lengths over 22 ft., 10 per cent. extra. Store prices are as follows:

	Steel.	Iron.	Seamless.
1 to 1½ in	35	35	35
1¾ to 2¼ in	50	35	35
2½ in	52½	35	35
2¾ to 5 in	60	47½	47½
6 in. and larger	50	35	..

Merchant Steel.—An unusually strong demand for Steel Tire in all sizes exists. The volume of business in Machinery Steel and Shafting is normal, and other grades are in fair demand. Prices are unchanged, and are as fol-

lows: Planished or Smooth Finished Tire Steel, 1.96½c.; Iron Finish, up to 1½ x ½ in., 1.91½c.; Iron Finish, 1½ x ½ in. and larger, 1.76½c., base; Channels for solid rubber Tires, ¾ to 1 in., 2.26½c., and 1⅛-in. and larger, 2.16½c.; Smooth Finished Machinery Steel, 2.16½c.; Flat Sleigh Shoe, 1.91½c.; Concave and Convex Sleigh Shoe, 2.06½c.; Cutter Shoe, 2.45c.; Toe Calk Steel, 2.31½c.; Railroad Spring, 1.96½c.; Crucible Tool Steel, 6½c. to 8c. and still higher prices are asked on special grades. Shafting, 50 per cent. off in car lots and 45 per cent. in less than car lots, base territory.

Cast Iron Pipe.—Quite a large number of orders of moderate tonnage are being booked, and some lettings of importance are in sight. St. Louis is preparing to ask for bids on about 6100 tons, and the Board of Public Service, Cincinnati, Ohio, is letting 2500 tons. Prices are asked by the Los Angeles Edison Company on 2500 tons, and the Denver Gas Company on 800 to 1000 tons. We quote per net ton as follows: Water Pipe, 4 in., $38 to $39; 6 to 12 in., $37 to $38; 16-in. and up, $36 to $37, with $1 extra for Gas Pipe.

Coke.—While there is a fair demand for prompt delivery, it is not so great as it was a month ago. Considerable business in future deliveries is reported. Connellsville 72-hr. Coke per car lot at ovens, for prompt shipment, is quoted at $3.25 to $3.50; Solvay Coke, $6.75, Chicago, prompt delivery; on contract lots for future delivery, $6.50 is being done.

Old Material.—Lighter use of Cast Scrap for a mixer, by foundries now well supplied with Pig Iron from delayed shipments received, is responsible for some falling off in demand. The demand for all Cast grades is good, however, though prices are a little easier, being shaded off 50c. a ton. No great activity is seen in Mill Iron, though a fair tonnage is being bought. On the whole the market exhibits no evidence of strength that inspires confidence in the maintenance of present price levels. The only Scrap list this week offered by railroads is one of 4500 tons by the Chicago, Burlington & Quincy. The following quotations are per gross ton, f.o.b. Chicago:

Old Iron Rails	$24.50 to $25.00
Old Steel Rails, 3 ft. and over	18.50 to 19.00
Old Steel Rails, less than 3 ft.	18.00 to 18.50
Relaying Rails, standard sections, subject to inspection	31.00 to 32.00
Old Car Wheels	25.00 to 25.50
Heavy Melting Steel Scrap	15.50 to 16.00
Frogs, Switches and Guards	16.50 to 17.00
Mixed Steel	12.50 to 13.00

The following quotations are per net ton:

Iron Fish Plates	$19.50 to $20.50
Iron Car Axles	26.50 to 27.00
Steel Car Axles	21.00 to 21.50
No. 1 Railroad Wrought	15.25 to 15.75
No. 2 Railroad Wrought	14.25 to 14.75
Railway Springs	15.00 to 15.50
Locomotive Tires, smooth	17.00 to 17.50
No. 1 Dealers' Forge	12.50 to 13.00
Mixed Busheling	11.00 to 11.50
Iron Axle Turnings	11.50 to 12.00
Soft Steel Axle Turnings	11.50 to 12.00
Machine Shop Turnings	11.50 to 12.00
Cast Borings	9.50 to 10.00
Mixed Borings, &c	9.50 to 10.00
No. 1 Mill	10.00 to 10.50
No. 2 Mill	9.00 to 9.50
No. 1 Boilers, cut to Sheets and Rings	11.50 to 12.00
No. 1 Cast Scrap	18.50 to 19.00
Stove Plate and Light Cast Scrap	15.00 to 15.50
Railroad Malleable	16.50 to 17.00
Agricultural Malleable	15.50 to 16.00

The Chicago offices of the Lackawanna Steel Company, J. P. Nicholas, manager, will, on May 1, be moved from the Merchants' Loan and Trust Building to rooms 1726-1728 Commercial National Bank Building.

Philadelphia.

PHILADELPHIA, PA., April 23, 1907.

Conditions in the Iron and Steel trades continue to be remarkably satisfactory. There is no abatement in the demand for Pig Iron, and the scarcity is about as great as it has been at any time in the past several months. Prices for spot delivery are therefore very strong, but vary according to where the furnace is located, and the amount of freight that has to be paid to deliver it to the consumer. For April shipment $26.50 to $27 is sometimes paid for carload lots, while for the second quarter good sized quantities can be had at about $25 to $25.50. For that delivery, however, Iron is increasingly scarce, so that the firmness is being gradually carried into the third quarter, and also to a moderate extent to the last quarter of the year. The strength of the market is due entirely to the inability of the furnaces to increase their output, as was rather confidently expected they would be able to do some time ago. As a matter of fact, some of them appear to be falling behind rather than otherwise. The scarcity would be felt still more severely if it were not for the frequent arrival of cargoes of foreign Iron. This Iron has been a most welcome addition to the totally inadequate domestic supplies, and has doubtless prevented serious inconvenience to founders throughout the entire country. Prices for imported Iron are a little dearer than they were a week ago, and $21 to $21.50 for No. 3 Middlesbrough alongside ship is about the best than can be done. Mill Irons are scarce, but large consumers seem to be able to supply themselves at from $22.50 to $22.75, delivered. Basic Iron appears to be somewhat neglected, although it is said that if anything were offered at a little less than $24 for May and June shipment it would stand a good chance of being promptly taken. Some fair sized lots have been taken at a price said to be something around $25.50 for immediate shipment to the vicinity of New York City, but apart from that there appears to be nothing doing as far as regards this district.

Pig Iron.—Apparently the situation is just about as it was a week ago, although makers and consumers of Pig Iron are somewhat at variance in regard to prices at which expiring contracts should be renewed. Basic for delivery during May and June is extremely scarce, and may be said to be practically unobtainable, although, if it could be had, $23.75 to $24.25 for local delivery would probably be considered about a fair price. In regard to the last half of the year, producers would probably be willing to make a slight concession, but buyers claim that it must be of considerable proportions to meet the requirements of buyers of the finished article. An adjustment of this matter cannot be delayed very much longer, as furnaces will need some new business in July, while consumers will also need to renew their contracts with Steel makers. The situation is so strong, however, that it is hardly likely that buyers will obtain much lower prices, as Pig Iron will be scarce from now until the end of July, with a fair prospect that the demand for the later months will also be very considerable. Meanwhile, however, both sides are endeavoring to come to a basis of agreement, so that business can be done not only with makers of Pig Iron, but with consumers of finished products, which has been held in abeyance until new figures are agreed upon for last half year deliveries. The foundry trade is in a different position, as it covers a great deal of territory embracing consumers of large quantities down to those who use comparatively small lots. With this class of trade things are working smoothly and will no doubt continue so for an indefinite period, as prices are not difficult to arrange with the majority of consumers. Prices for May and June average from $24.50 to $25 for No. 2 X Foundry, while spot lots command $25.75 to $26.50 delivered, according to circumstances. Gray Forge is scarce and commands $22.50 to $22.75 in this immediate district, and about 25 cents less at points more toward the interior. Middlesbrough Iron is strong and commands $21 and from that to $21.50 alongside ship, and Scotch of the same delivery at about $23.50. There is no indication of any change in the immediate future, as the demand readily absorbs the entire output from week to week, so that quotations may be given as follows for deliveries in buyers' yards in eastern Pennsylvania or adjoining districts:

Spot No. 2 X Foundry	$25.75 to $26.50
Second Quarter 1907.	
No. 2 X Foundry	$24.50 to $25.00
Basic	23.75 to 24.25
Gray Forge	22.50 to 22.75
Third Quarter 1907.	
No. 2 X Foundry	$24.00 to $24.50
Basic	23.00 to 23.50
Gray Forge	22.25 to 22.50
Fourth Quarter 1907.	
No. 2 X Foundry	$23.00 to $23.50
Basic	22.50 to 23.00
Gray Forge	21.75 to 22.00

Ferroalloys.—Business is rather quiet at the present time, but prices are said to be firmer, although there are some holders who would accept $68 to $70 for prompt shipment and $63 to $65 for the last half of the year, the price being according to quantity and date for delivery.

Steel.—Business appears to be in abeyance, waiting for an expected revision of prices. Makers of Steel say they cannot do any better than $32 to $32.50, delivered, for ordinary Rolling Billets, and $36 to $38 for Forging Steel, which buyers regard as beyond their limits. Concessions cannot be made, however, unless some reduction can be had on the raw materials, pending which only small sales are being made at about the prices above named.

Structural Material.—The demand for small lots is quite active, and the mills thus far have been able to run to their full capacity. They all complain of a shortage of Pig Iron, however, so that they have not much room for new business for immediate delivery, although there is some anxiety in regard to the later months of the year. Prices are nominally 1.83½c. to 2c. for Beams, Angles and Channels, according to specifications, but for first-class business it is said that slight concessions can be had from the figures named.

Plates.—Specifications are very good, and the mills are fully employed in this direction. New business, however, is only moderate, although during the last few days there has

been a good deal more inquiry, which may result in a larger business in the near future. Prices are unchanged, as follows:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel	1.98½	2.03½
Flange or Boiler Steel	2.23½	2.28½
Marine	2.53½	2.58½
Locomotive Firebox Steel	2.63½	2.68½

The above are base prices for ¼-in. and heavier. The following extras apply:

	Extra per 100 lb.
3-16-in. thick	$0.10
Nos. 7 and 8, B. W. G	.15
No. 9, B. W. G	.25
Plates over 100 to 110 in	.05
Plates over 110 to 115 in	.10
Plates over 115 to 120 in	.15
Plates over 120 to 125 in	.25
Plates over 125 to 130 in	.50
Plates over 130 in	1.00

Bars.—The demand for Bar Iron is satisfactory without being in any degree urgent. The deliveries during January from 24 mills in this territory were 24,764 tons, and in March from 25 mills the deliveries were 25,695 tons. February was a comparatively light month, being only 20,624 tons. During the three summer months of last year—July, August and September—the deliveries totaled about 45,000 tons, showing that 1907 is at least bringing in a comparatively large tonnage. Prices are firm with 1.83½c. as an inside figure for Best Refined Iron to 1.88½c. for less than carload lots. Steel Bars continue scarce, and prompt shipments command about the same figures as for Best Refined Bar Iron.

Sheets.—The demand keeps up remarkably and the mills are as full of work as they possibly can be. Prices are of course very firm, although quotations are nominally the same as last week, which for mill shipments are as follows, with the usual advance on small lots: Nos. 18 to 20, 2.80c.; Nos. 22 to 24, 2.90c.; Nos. 25 to 26, 3c.; No. 27, 3.10c., and No. 28, 3.20c.

Old Material.—The market is in a very mixed condition, although it is by no means weak. There is a considerable scarcity of some kinds of material, which of course commands fancy prices for prompt delivery, while in other cases material which is not so urgently needed shows no response to the firmness in other departments. Bids and offers are about as follows, for deliveries in buyers' yards:

Steel Crops and Rails	$19.00 to $19.50
No. 1 Steel Scrap	18.75 to 19.25
Low Phosphorus	23.00 to 23.50
Old Steel Axles	21.50 to 22.00
Old Iron Axles	30.50 to 31.50
Old Iron Rails	27.00 to 27.50
Old Car Wheels	24.00 to 25.00
Choice No. 1 R. R. Wrought	20.50 to 21.00
No. 1 Yard Scrap	18.50 to 19.00
Long and Short	18.00 to 18.50
Machinery Scrap	21.00 to 21.50
Wrought Iron Pipe	17.00 to 17.50
No. 1 Forge Fire Scrap	16.50 to 17.00
No. 2 Light	11.50 to 12.00
Wrought Turnings	16.75 to 17.25
Axle Turnings	16.75 to 17.00
Stove Plate	17.25 to 17.75
Cast Borings	15.75 to 16.25
Grate Bars	16.00 to 16.50

Birmingham.

BIRMINGHAM, ALA., April 21, 1907.

Pig Iron.—Much interest has been manifested in the Iron market during the past week. In addition to the usual number of small sales, several large ones are reported, including one for a considerable tonnage to the leading Pipe interest of the country. The exact quantity and price for this latter have not been given out, but it is understood to be the largest transaction which has been consummated here for some time. There is still a good demand for spot Iron, but by far the largest buying has been for delivery over the third and fourth quarters. It is now stated that practically all the iron which will be produced the third quarter is under contract. Prices to-day are about as follows: Spot shipments, $22.50; May and June, $21.50 to $22; third quarter, little if any to be had, $19; last quarter, practically all the manufacturers asking $19, but on very desirable business $18.50 might still be done. Shipments are moving satisfactorily and all the yards are now practically clear of everything except off grades.

The No. 3 Furnace of the Woodward Iron Company is again in blast, after a suspension of about three weeks due to an accident to the lining.

The No. 1 Furnace of the Shelby Iron Company, at Shelby, Ala., was blown in this week on Coke Iron, after being out of blast the past four months undergoing general repairs and relining. The No. 2 Furnace is running on Charcoal Iron. The product of these two furnaces is made largely from brown Ore, and is in much demand by the melters throughout the country. The Hammond-Byrd Company, of this city, has been appointed selling agent for the company.

Cast Iron Pipe.—Foundries here manufacturing Water Pipe report orders covering their entire output for the next three months on practically all sizes, and on the staple sizes their production is booked for six months ahead. The orders which nearly all the plants are running on now are for small tonnage, and as a rule are from the smaller municipalities to be used for extension purposes. The larger cities have hesitated about placing business owing to the high prices now necessarily prevailing, but several good-sized contracts are to be let in the near future. Much activity is noted in Cast Iron Soil Pipe, of which probably 25 per cent. of the amount consumed in the United States is manufactured in this district. Labor conditions have greatly restricted the output here, while the demand for the past several months has been the greatest in the history of the business. Stocks are therefore depleted, with all foundries far behind with their orders. The labor situation is now improving, and it is thought that the manufacturers will soon be in position to handle business more promptly. Quotations on Water Pipe remain unchanged with the market quite firm at the following prices per net ton: 4 to 6 in., $35; 6 to 12 in., $33; over 12 in., average $31, with Gas Pipe $1 extra per ton.

Old Material.—The demand for Heavy Cast exceeds the supply, and all offerings of this grade are snapped up as soon as placed on the market. The local consumers of Wrought decline to make any bids whatever, claiming to have good stocks and therefore not interested. Dealers' quotations are approximately as follows per gross ton, f.o.b. cars here:

Old Car Wheels	$20.50 to $21.00
Old Iron Rails	22.00 to 22.50
Old Iron Axles	18.50 to 19.00
Old Steel Axles	16.50 to 17.00
No. 1 Railroad Wrought	18.50 to 19.00
No. 2 Railroad Wrought	13.00 to 13.50
No. 1 Country Wrought	13.00 to 13.50
No. 2 Country Wrought	12.00 to 12.50
Wrought Pipe and Flues	13.50 to 14.00
Railroad Malleable	13.00 to 13.50
No. 1 Steel	14.00 to 14.50
No. 1 Machinery Cast	16.50 to 17.00
Stove Plate and Light Cast	12.50 to 13.00
Cast Borings	8.50 to 9.00

Pittsburgh.

PARK BUILDING, April 24, 1907.—(*By Telegraph.*)

Pig Iron.—There is every appearance of a runaway market in Bessemer and Basic Pig Iron, largely due to the heavy sales made recently to the Youngstown Sheet & Tube Company, Cambria Steel Company, and other large consumers for delivery over the last half of the year. These sales pretty well cleaned up the available supply for the last half of the year, and on top of this has come a heavy demand for both Bessemer and Basic from consumers who have not covered, and are now in the market for large tonnages, which they are having trouble to find. About two weeks ago upward of 250,000 tons of Bessemer and Basic were sold for last half of the year at $21 at furnace, but the absolute minimum of the market to-day for last half of the year is $22, Valley furnace, on both Bessemer and Basic, and in one case $22.50 has been paid. Sales of one block of 16,000 tons of Standard Bessemer Iron and another of 6000 tons, both for last half of the year delivery, have been made at $22, Valley furnace, also a sale of 6000 tons for last half at $22.50, Valley furnace. There is practically no Besemer or Basic to be had for May and June, and any small lots that could be picked up would readily bring $23, Valley furnace. We quote Bessemer and Basic Pig Iron for May and June delivery at $23, and for last half of the year at $22, Valley furnace. Inquiries are in the market for 8000 to 10,000 tons of Gray Forge Iron for third and fourth quarter. There is some inquiry for Foundry Iron, Northern brands of No. 2 being held at $24 to $25 for prompt delivery, $23 to $24 for second quarter, and $22 and $23, Valley furnace, for last half delivery. Gray Forge Iron is held at $21 to $21.50, at furnace, or $21.85 to $22.35, Pittsburgh, some leading sellers refusing to accept less than the higher price.

Steel.—Bessemer and Open Hearth Billets are still very difficult to obtain and for prompt delivery Bessemer Billets would bring about $30.50, and Open Hearth $31.50 to $32, Pittsburgh. We note a sale of 4 x 4 in. Bessemer Billets for third quarter delivery on the basis of $29.95, delivered Pittsburgh. Sheet and Tin Bars in random lengths are held at $30.50 to $31, makers' mill, Pittsburgh, or Youngstown.

(*By Mail.*)

Within the past week a very active demand has developed for Bessemer and Basic Iron for third quarter and last half of the year delivery, and on account of the heavy sales made several weeks ago to the Youngstown Sheet & Tube Company, Cambria Steel Company, Sharon Steel Hoop Company and other large consumers, the available supply for last half of the year delivery is light and prices have advanced. Large sales for last half of the year delivery have been closed at $22, Valley furnace, and some makers are quoting as high as $23 at furnace, but there have been no sales as yet at this price. There is practically no Bessemer or Basic for May and June delivery, and any little

lots that could be picked up readily bring $23 at Valley furnace. Predictions have been made that we will have a famine in Pig Iron if the present heavy consumption continues, and it is claimed that some large consumers have not yet covered more than 40 to 50 per cent. of their requirements for the second half of the year. Stocks of Pig Iron at both the furnaces and the mills are practically exhausted, showing conclusively that the Iron is being consumed as fast as made. There will be some new blast furnace capacity active prior to July 1, and considerably more in the second half, and this will relieve the situation to some extent. The supply of Steel is not any better, and $30, Pittsburgh, has been paid the past week for fair sized lots of Billets for last half of the year delivery. New business in Finished Iron and Steel is not as heavy as it was in March, but this is due to the fact that large consumers are covered for the first half of the year and are specifying heavily against contracts. All the finishing mills are sold up for some months ahead, and while output and shipments are enormously heavy, the mills are not catching up on deliveries. The only weak spot in the market is Coke, which has gone off owing to the heavy supply and the fact that some producers are compelled to move Coke already loaded on cars and take practically whatever prices they can get for it. The Scrap market is rather quiet, but the better feeling in Pig Iron is expected to be reflected in that direction before long.

Ferromanganese.—Prices continue very erratic, but are lower. A sale of about 30 tons of foreign, 80 per cent., has been made to a local consumer for spot delivery at $71, Pittsburgh, or $69, Baltimore. A sale of 150 tons has also been made to a Western consumer, deliveries being 30 tons a month for five months, commencing May, at $69, delivered, equal to about $65, Baltimore. We quote foreign, 80 per cent., at $70 to $71, Pittsburgh, for prompt delivery, and for delivery over second half of the year $62 to $63, Baltimore, or $65 to $66, Pittsburgh.

Muck Bar.—There is a good deal of inquiry, with the supply very limited, and prices are slightly higher. We quote best grades made from all Pig Iron at $37 to $38, Pittsburgh, a sale of 600 tons being reported at the inside figures.

Rods.—Small Wire Nail mills that do not roll their own Rods are having great trouble in getting deliveries, Rods having been very scarce and hard to obtain for some time. We quote Bessemer and Open Hearth Rods at $37 to $38, Pittsburgh, but on a firm offer and for prompt delivery $38 or higher would have to be paid.

Skelp.—The large inquiries in the market for Grooved and Sheared sizes of Iron Skelp referred to last week have not been placed, as none of the mills is in position to take on more tonnage and make deliveries before August or later. Some of the larger Pipe mills are urgently in need of Skelp, but so far have not been able to place contracts and get deliveries wanted. It is probable that for reasonably prompt shipment higher prices than we quote would have to be paid. The market is as follows: Grooved Steel Skelp, 1.85c. to 1.90c.; Sheared Steel Skelp, 1.90c. to 1.95c.; Grooved Iron Skelp, 2.20c. to 2.25c.; Sheared Iron Skelp, 2.30c. to 2.35c.

Steel Rails.—Announcement is just made by the Pennsylvania Railroad Company that its requirements of Steel Rails for 1908 will be 153,000 tons, or a little less than it will take this year. Inquiries for Rails in the past week or two have been light. Actual orders taken last week by the Carnegie Steel Company amounted to only about 1500 tons of Standard Sections and a smaller tonage of Light Rails. We quote Light Rails as follows: $33 to $34 for 20 to 45 lb.; $34 to $35 for 16-lb., and $35 to $36 for 12-lb., at mill. Angle Splice Bars are held at 1.65c., and Standard Section Rails at $28, at mill.

Structural Material.—The past week has been somewhat quiet as regards the placing of large contracts, but there is an active inquiry with a good deal of large work in sight. Quite a tonnage is being placed for mining, cement and other light Structural work, the American Bridge Company having recently closed a number of such contracts. Prices are very firm and we quote: Beams and Channels, up to 15-in., 1.70c.; over 15-in., 1.80c.; Angles, 3 x 2 x ¼ in. thick up to 6 x 6 in., 1.70c.; 8 x 8 and 7 x 3½ in., 1.80c.; Zees, 3-in. and larger, 1.70c.; Tees, 3-in. and larger, 1.75c. Under the Steel Bar card, Angles, Channels and Tees under 3-in. are 1.70c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Plates.—The mills are not making much progress in catching up on contracts, due to the scarcity of Steel and of cars. Actual new business being placed is not as heavy as it was some time ago, but all the mills are much behind in deliveries and some are turning down inquiries almost daily, being unable to get Steel or cars fast enough to ship out product, and are not in position to take on more tonnage and make deliveries wanted. For fairly prompt shipment premiums of $2 to $3 a ton continue to be paid over official prices, which are as follows: Tank Plate, ¼-in. thick, 6¼ in. up to 100 in. wide, 1.70c. to 1.80c., base, at mills, Pittsburgh. Extras over this price are as follows:

	Extra per 100 lb.
Gauges lighter than ¼-in. to and including 3-16-in. Plates on thin edges	$0.10
Gauges Nos. 7 and 8	.15
Gauge No. 9	.25
Plates over 100 to 110 in.	.05
Plates over 110 to 115 in.	.10
Plates over 115 to 120 in.	.15
Plates over 120 to 125 in.	.25
Plates over 125 to 130 in.	.50
Plates over 130 in.	1.00
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.)	.10
Complete Circles	.20
Boiler and Flange Steel Plates	.10
"A. B. M. A." and ordinary Firebox Steel Plates.	.20
Still Bottom Steel	.30
Marine Steel	.40

Shell Grade of Steel is abandoned.

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within 10 days from date thereof, discount of ½ of 1 per cent. is allowable. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 in. wide down to 6 in. of Tank, Ship or Bridge quality.

Sheets.—The mills are still far back in deliveries and are unable to satisfy customers that want reasonably prompt shipments of Sheets. The shortage of Steel and the scarcity of cars do not promise to be relieved very soon. Prices are firm and for reasonably prompt delivery $2 to $3 a ton premiums are being paid over regular prices for forward delivery, which are as follows: Blue Annealed Sheets, No. 10 gauge and heavier, 1.85c.; Nos. 11 and 12, 1.90c.; Nos. 13 and 14, 1.95c.; Nos. 15 and 16, 2.05c.; Box Annealed, Nos. 17 to 21, 2.35c.; Nos. 22 to 24, 2.40c.; Nos. 25 and 26, 2.45c.; No. 27, 2.50c.; No. 28, 2.60c.; No. 29, 2.75c.; No. 30, 2.85c. We quote Galvanized Sheets as follows: Nos. 10 and 11, 2.65c.; Nos. 12 and 14, 2.75c.; Nos. 15 and 16, 2.85c.; Nos. 17 to 21, 3c.; Nos. 22 and 24, 3.15c.; Nos. 25 and 26, 3.35c.; No. 27, 3.55c.; No. 28, 3.75c.; No. 29, 4c., and No. 30, 4.25c. We quote No. 28 Gauge Painted Roofing Sheets at $1.85 per square, and Galvanized Roofing Sheets, No. 28 gauge, $3.25 per square for 2-in. corrugations. These prices are for carload lots, jobbers charging the usual advances.

Hoops and Bands.—New business is getting heavier, and premiums continue to be paid for reasonably prompt shipments. For forward delivery we quote: Steel Hoops, 2c., and Bands for all purposes at 1.60c., base, half extras, as per Standard Steel card. These prices are for carload lots, f.o.b. Pittsburgh, plus full tariff rail rate to point of delivery, an advance of $2 a ton being charged for less than carloads.

Tin Plate.—Large consumers are placing heavy orders for delivery through the second half of the year, and a heavy tonnage has already been booked. Leading mills are pretty well sold up into the third quarter, with a good deal of business yet to be placed for last quarter. The supply of Tin Bars does not show any betterment, and cars are also scarce, both of which operate against maximum output and shipments. General prices at which business is being taken for second half of the year delivery are as follows: $3.90 for 100-lb. Cokes, f.o.b. Pittsburgh, for 14 x 20 100-lb. Cokes, terms 30 days, less 2 per cent. off for cash in 10 days, on which price a rebate of 5c. a box is allowed for carload and larger lots.

Iron and Steel Bars.—The demand for Steel Bars continues active, but as yet the implement makers are not showing a disposition to contract freely ahead, no doubt still hoping for a concession in prices by the mills, but which there is not much prospect of being granted. Specifications on contracts are heavy, and for reasonably prompt delivery as high as 1.75c. to 1.80c. is being paid by consumers. One local Steel Bar interest has put its minimum price for Steel Bars at 1.80c., Pittsburgh, and it is said to be booking considerable tonnage at this figure for prompt delivery. The demand for Iron Bars is also quite active, but is not as heavy as some time ago, and, as noted last week, prices are a shade easier with some mills. We quote Refined Iron Bars at 1.80c., Pittsburgh, and Steel Bars at 1.60c., base, half extras, f.o.b. Pittsburgh, these prices being for forward delivery.

Spelter.—The market continues dull, prime grades of Western for forward delivery being held at about 6.65c., St. Louis, or 6.67½c., Pittsburgh, and for spot delivery 6.70c. to 6.75c., St. Louis.

Railroad Spikes.—The mills can make fairly prompt delivery on standard sizes, but on the smaller sizes are from two to three months behind in shipments. We quote standard sizes at $2.30 to $2.35, and the smaller sizes at $2.50 to $2.60 per 100 lb., f.o.b. Pittsburgh.

Merchant Steel.—An active demand is reported for Steel Shafting and we are advised that official prices are being rigidly held, and in some cases slight premiums are asked for prompt delivery. We also note a fairly active demand for Tire and Machinery Steel of special grades and shapes. Smooth Finished Machinery Steel, 1.85c. to 2c.,

depending on quality; Flat Sleigh Shoe, 1.65c. to 1.75c.; Cutter Shoe, 2.15c. to 2.20c.; Toe Calk Steel, 2.10c. to 2.15c.; Railroad Spring Steel, 1.75c. to 1.80c.; Crucible Tool Steel, 6c. to 8c., for ordinary grades, and 10c. and upward for special grades. We quote Cold Rolled Shafting at 50 per cent. off in carloads, and 45 per cent. in less than carloads, delivered in base territory.

Merchant Pipe.—It is the old story with Pipe, the mills being simply congested with tonnage, and filled up for three or four months. Several Pipe concerns have recently withdrawn quotations and are selling their product subject to price arrangement at time of delivery. Under date of April 22, the Youngstown Sheet & Tube Company, Youngstown, Ohio, put out a new list on Pipe, showing an advance of one point, or $2 a ton over the previous list. We have advanced quotations one point on both Iron and Steel Pipe, but note that some mills advise us they are able to get even higher prices than are quoted in our discounts. The extreme discount on Merchant sizes of Iron Pipe is now about 67 per cent. on ¾ to 6 in., on which a half point and sometimes a point is allowed to the large trade. The extreme discount on Merchant sizes of Steel Pipe, ¾ to 6 in., is now about 73 per cent. to the large trade. Official discounts on Steel Pipe are as follows:

Merchant Pipe.

Jobbers, carloads.

	Steel. Black.	Galv.
	%	%
⅛ to ¼ in	64	48
⅜ in	66	52
½ in	68	56
¾ to 6 in	72	62
7 to 12 in	67	52
Extra strong, plain ends:		
⅛ to ⅜ in	57	45
½ to 4 in	64	52
4½ to 8 in	60	48
Double extra strong, plain ends:		
½ to 8 in	53	42

Official discounts on Iron Pipe, which are shaded one-half point or more to the large trade, are as follows, f.o.b. Pittsburgh:

Standard Genuine Iron Pipe.

	Black.	Galv.
	%	%
¾ to 6 in	67	57
½ in	62	50
⅜ in	60	42
⅛ and ¼ in	58	42
7 to 12 in	62	47
Extra Heavy Iron Pipe, Plain Ends.		
⅛, ¼ and ⅜ in	62	40
½ to 4 in	59	47
4½ to 8 in	55	42

Boiler Tubes.—A heavy demand is reported for both Merchant and Locomotive Tubes, some mills stating that they are able to get a premium of $1 to $2 a ton over regular discounts, which are as follows:

Boiler Tubes.

	Iron.	Steel.
1 to 1½ in	41	47
1¾ to 2¼ in	42	59
2½ in	47	61
2¾ to 5 in	52	65
6 to 13 in	42	59

Iron and Steel Scrap.—In marked contrast with conditions existing in the Pig Iron trade Scrap continues quiet and prices are somewhat weak and lower. Large consumers are pretty well covered and are out of the market, with the result that very little Scrap is changing hands. Dealers quote about as follows, per gross ton, f.o.b. Pittsburgh: Heavy Steel Scrap, $17.75 to $18; No. 1 Wrought Scrap, $19; No. 2 Wrought Scrap, $17.75 to $18; Old Steel Rails, short pieces, $18.25; Old Steel Rails, rerollers, $18.50; Machine Shop Forgings, $15.50; Bundled Sheet Scrap, $16.50 to $16.75; Low Phosphorus Melting Stock, $21.50 to $22; Cast Iron Borings, $13.50 to $13.75; Old Car Wheels, $26; Steel Axles, $21 to $21.50; No. 1 Cast Scrap, $21; Grate Bars, $16 to $16.50; Stove Plate, $16.

Coke.—There seems to be an oversupply of Furnace Coke for prompt delivery, and, as much is already loaded on the cars and has to be moved, the producers are often compelled to sell it for the best price they can get. Sales of Connellsville Furnace Coke for prompt delivery have been made at $2.65 at oven, while Furnace Coke made outside of the Connellsville region, and which runs somewhat high in sulphur, is being offered as low as $2.25 for prompt shipment. Connellsville 72-hr. Foundry Coke for prompt delivery is freely offered at $3.25 to $3.50 a ton at oven. The output continues heavy, the Upper and Lower Connellsville regions having made last week 416,770 tons.

A. C. Daft, formerly with Reed F. Blair & Co., and more recently with Hickman, Williams & Co., and T. R. Heywood, formerly with Naylor & Co., have opened an office in the Frick Building Annex, Pittsburgh, under the firm name of Daft, Heywood & Co., Incorporated, and will do a brokerage business in Pig Iron, Alloys, Coal and Coke.

The offices of Hyde Brothers & Co., dealers in Iron, Steel, New and Relaying Rails and Track Supplies, have been removed from the Empire Building to the Commonwealth Building, Pittsburgh.

Cincinnati.

FIFTH AND MAIN STS., April 24, 1907.—(*By Telegraph.*)

Pig Iron.—Notwithstanding the reports that have been prevalent for some weeks to the effect that the output of Northern furnaces had practically been disposed of, it appears that considerable tonnage has been contracted for during the week, the major portion of which is to come from this territory, and is for delivery the latter half of the year. One large melter in the northern part of this State bought 1600 tons, and 1000 tons was sold to another, the delivery in each case covering last half. Quotations on Northern Irons are well established and the demand is quite active. The situation, so far as the South is concerned, is very strong, and the general feeling as to the future is decidedly optimistic. Appearances indicate that prices for the last half are gradually showing more strength, and while it is true that one or two producers are still naming $18.50. Birmingham, for this delivery, the trend of sentiment is toward a $19 basis, this price now being demanded by a majority of the furnaces of the South. Reports indicate that considerably less than 35,000 tons of Foundry grades now remain upon furnace yards. Shipments are now coming forward in a very satisfactory manner, which has had a decided effect upon spot prices, and they are to-day practically the same as those quotable for May and June delivery. A local foundry bought 750 tons of Southern and Virginia brands for delivery over the last half, said to have been at established quotations. A stove concern in southern Ohio closed a contract yesterday for considerable tonnage, covering its requirements for the balance of the year. Freight rates from Hanging Rock District to Cincinnati are $1.15, and from Birmingham, $3.25. We quote for second quarter delivery, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1	$25.25 to $25.75
Southern Coke, No. 2	24.75 to 25.25
Southern Coke, No. 3	24.25 to 24.75
Southern Coke, No. 4	23.25 to 23.75
Southern Coke, No. 1 Soft	25.25 to 25.75
Southern Coke, No. 2 Soft	24.75 to 25.25
Southern Coke, Gray Forge	22.25 to 22.75
Southern Coke, Mottled	21.25 to 21.75
Ohio Silvery, 8 per cent. Silicon	31.15 to 31.65
Lake Superior Coke, No. 1	25.15 to 25.65
Lake Superior Coke, No. 2	24.65 to 25.15
Lake Superior Coke, No. 3	24.15 to 24.65
Car Wheel Irons.	
Standard Southern Car Wheel	$29.00 to $29.50
Lake Superior Car Wheel	27.50 to 28.00

Coke.—The market is rather quiet and prices are somewhat weak. The supply is plentiful and contract business is moving regularly. We quote the best brands of Connellsville and Virginia Foundry brands from $3.40 to $3.65, f.o.b. ovens.

Finished Iron and Steel.—The volume of business continues strong, particularly along the line of Plates, Bars and Structural Shapes. Orders for Structural Material have been heavy during the week, while deliveries on Plates are slightly better than a week since. The mills are rapidly selling their output for the second half of the year and deliveries, especially for prompt shipment, are difficult to secure. A few sales of Rails for delivery during 1908 have been reported, but no large quantities have as yet been ordered. The mills are still quoting on 60 to 90 day deliveries on Steel Bars and Tire. We quote, f.o.b. Cincinnati, as follows: Iron Bars, carload lots, 1.83c., with half extras, smaller lots from store, 2c., with full extras. Steel Bars, carload lots, 1.73c., half extras, smaller lots from store, 1.95c., with full extras. Base Angles, carload lots, 1.83c. Beams and Channels, carload lots, 1.83c., base. Plates, ¼-in. and heavier, carload lots, 1.83c., base, and smaller lot from store, 2c. Sheets, No. 16, carload lots, 2.05c., and smaller lots from store, 2.60c.; No. 14, carload lots, 1.95c., and smaller lots from stock, 2.50c. Steel Tire, 1 x ¼ in. or heavier, 1.93c. in carload lots.

Old Material.—Dealers report a fair amount of activity and stocks are light. We quote dealers' prices, f.o.b. Cincinnati, about as follows:

No. 1 R. R. Wrought, net ton	$16.50 to $17.00
Cast Borings, net ton	9.00 to 9.50
Steel Turnings, net ton	12.00 to 12.50
No. 1 Cast Scrap, net ton	17.50 to 18.00
Old Iron Axles, net ton	25.50 to 26.00
Old Iron Rails, gross ton	24.00 to 25.00
Old Steel Rails, long, gross ton	17.50 to 18.00
Relaying Rails, 56 lb. and up, gross ton	28.25 to 29.25
Old Car Wheels, gross ton	24.00 to 24.50
Low Phosphorus Scrap, gross ton	19.50 to 20.00

The new Pig Iron firm of Eaton & Rhodes has moved into permanent quarters at 1509 First National Bank Building, Cincinnati.

The Southern Steel Company is putting its Gadsden furnace in shape to make Foundry Iron, instead of basic, as heretofore. This is said to have been done in order to catch up on orders for this grade. It is expected to be in operation about May 1.

Cleveland.

CLEVELAND, OHIO, April 23, 1907.

Iron Ore.—Vesselmen and Ore shippers are still anxiously awaiting the breaking up of ice at the Soo, which means the opening of navigation between the lower lakes and Lake Superior. The warm weather the past few days has softened the ice and it is almost certain now that boats will get through this week. In the meantime a fleet of about 30 boats has gathered at Detour, waiting the chance to get through the ice and hurry to Lake Superior ports for cargoes. The ice has moved out at the head of Lake Superior, so that the boats can reach the docks, and the loading of Ore boats was started at Superior Saturday and at Ashland Monday. Steamers of the Steel Corporation have begun to load at Two Harbors. Several boats sailed from Duluth Monday, expecting that the ice will be broken up when they reach the Soo. Ore is now moving satisfactorily from Escanaba, three cargoes reaching Cleveland yesterday from that port. This is the first Ore to arrive this season, except a small cargo that came in last week. More Ore cargoes are expected in from Escanaba to-day, and several others are on the way, four Ore laden vessels having sailed from that port Monday. The stock piles of some furnaces are getting very low and the furnacemen are anxious for the first cargoes, but they all seem to have enough to keep them running till they receive new Ore, although some furnaces have been compelled to change their mix. Considerable old Ore is still being moved from the docks, most of which are now pretty well cleaned up. The Ore market is very quiet, there being only an occasional inquiry. Prices for 1907 delivery remain unchanged, being as follows at Lake Erie docks per gross ton: Old Range Bessemer, $5; Mesaba Bessemer, $4.75; Old Rauge Non-Bessemer, $4.25; Mesaba Non-Bessemer, $4; Siliceous Bessemer, $2.75; Siliceous Non-Bessemer, $2.50.

Pig Iron.—The market is very strong, and there is more activity in Northern Foundry Iron for the last half delivery than there has been for several weeks. Although no large individual sales are reported, the total tonnage booked during the week made a good sized volume. The sales for the second half have been made at $22.50, Valley furnace, no No. 2 Foundry Iron being offered at a lower figure for that delivery. For third quarter delivery sales are reported at $22.50 to $23, Valley furnace, for No. 2. Some of the furnaces that are pretty well sold out for the balance of the year are not disposed to sell any more Iron at present prices and are holding their No. 2 Foundry Iron at $23 for last quarter delivery. Spot Foundry Iron continues in good demand, and is still very scarce, although melters seem to be able to find enough to supply their needs by paying the prevailing high prices for quick delivery. Sales of No. 2 Foundry for spot delivery are reported at $25 to $26. There is a fairly good demand for Southern Foundry Iron for last half delivery, and very few furnaces are now willing to sell No. 2 for less than $19, Birmingham. The Basic and Bessemer situation is strong and furnaces report very little left for sale for last half delivery. A few small sales of spot Basic Iron are reported at $23.50, at furnace. A local Basic Iron interest that has only a small amount of Iron left for sale for the last quarter, having recently sold the greater part of the output of its furnace at $21, announces that it will sell no more for the last quarter delivery for less than $23. Quotations for the last half of 1907, f.o.b. Cleveland, are as follows:

Bessemer	$21.85
Northern Foundry, No. 1	23.00
Northern Foundry, No. 2	22.50
Northern Foundry, No. 3	22.00
Southern Foundry, No. 2	$22.85 to 23.35
Gray Forge	21.00 to 21.50

Coke.—The market remains quiet and prices are weak. Furnace Coke is selling at $2.75 to $2.80 at oven for prompt shipment, and Foundry Coke at $3.40 to $3.50 at oven. There is little demand either for spot shipment or for future delivery.

Finished Iron and Steel.—The general situation remains satisfactory, except in the matter of deliveries, which show no improvement anywhere, indicating that there is no falling off in the volume of business. Some of the smaller consumers, particularly of Steel Bars, are confronted with a serious situation because of being unable to secure deliveries of material which they ordered the first of the year. These consumers thought they placed their orders in ample time for shipment along in April, and now they are greatly in need of material that in many cases they must wait several weeks for. Specifications are still coming in heavily, and a fair amount of new business has been placed on the books during the past weeks. The larger consumers seem to have previously covered for the last half delivery, and the orders that are now being placed are not for a large amount of tonnage. Some of the agricultural implement makers have come into the market during the week and made contracts for Steel Bars for next year's delivery on the basis of 1.60c., Pittsburgh. These interests seem to have reached the conclusion that they have no hope of getting any concession from the current market price this year. No change is noted in the Steel Bar situation, Bars for early delivery being fully as scarce as they have been for the past few weeks. Jobbers report that they have to pay from 1.85c. to 1.90c., Pittsburgh, for Steel Bars for quick delivery to replenish stocks, and that they are unable to sell Bars for early shipment in carload lots at much below stock prices. The Bar Iron situation is easy, and the demand only fair. Most contracts for Iron Bars for future delivery are being made on the basis of 1.75c., Pittsburgh, or 1.84½c., Cleveland. No particular change is noted in the Plate situation. Future contracts are being made on the basis of 1.70c., Pittsburgh. For delivery in from three to four weeks mills are asking 1.90c. to 2c., Pittsburgh, for Plates. Sheet deliveries by the leading interest are still about six months behind. Two of the independent mills have made a slight advance the past week in the heavier gauge of Sheets. Independent mills are now promising deliveries in two to three months in heavy Sheets and in three to four months in lighter Sheets. The Structural situation is fairly good. Specifications are coming in heavily, but not a great amount of new orders are being booked. The leading mills are two to three months behind on deliveries. Warehouse business in Finished Material is still heavy, and prices are unchanged. Steel Bars are quoted out of stock at 1.95c. to 2c., and Iron Bars at 2c. Warehouse prices on Sheets are as follows: Blue Annealed, No. 10, 2.30c.; No. 28, One Pass Cold Rolled, 3.05c.; No. 28, Galvanized, 4.15c. The stock price on Boiler Tubes, 2¾ to 5 in., is 64 per cent. discount, and on Black Iron Merchant Pipe, base sizes, 67 per cent. discount.

Old Material.—The market is weak and prices are a shade lower. There are but few inquiries, and those who want to buy are unwilling to pay the prices asked. Large consumers seem to be pretty well covered. The only Scrap that is strong in No. 1 Cast and Stove Plate, both of which are very scarce. Turnings, which had been quite active for several weeks, are not so strong, the demand having fallen off. Wrought Scrap is weak. There is some demand for Steel Scrap. Dealers' prices to the trade are as follows per gross ton, f.o.b. Cleveland:

Old Steel Rails	$16.50 to $17.00
Old Iron Rails	24.00 to 25.00
Steel Car Axles	21.50 to 22.50
Old Car Wheels	21.50 to 22.50
Relaying Rails, 50 lb. and over	29.00 to 31.00
Relaying Rails, under 50 lb.	31.00 to 32.50
Heavy Melting Steel	16.50 to 17.00
Railroad Malleable	17.50 to 18.50
Agricultural Malleable	15.50
Light Bundled Sheet Scrap	16.00 to 17.00
Bundled Tin Scrap	17.00 to 19.00

The following quotations are per net ton, f.o.b. Cleveland:

Old Car Axles	$29.25 to $29.75
Cast Borings	10.50 to 11.50
Iron and Steel Turnings and Drillings	12.50 to 13.00
No. 1 Busheling	14.50 to 15.00
No. 1 Railroad Wrought	17.00 to 17.50
No. 1 Cast	18.00 to 19.00
Stove Plate	14.50 to 15.00

Good Record of an Open Hearth Furnace.—The No. 10 open hearth furnace at the South Buffalo, N. Y., plant of the Lackawanna Steel Company has just gone out for overhauling, after a run in which 27,566 gross tons of ingots was produced without any repairs. This record is particularly interesting in view of the fact that the furnace has worked with an all cold metal charge, the pig iron portion of which has consisted almost entirely of Bessemer iron, the small amount of basic iron used being sand cast metal purchased in the market. The scrap portion of the charge has been almost all cast iron.

The Locke Regulator Company, Salem, Mass., defended a suit brought against Landers, Frary & Clark, New Britain, Conn., for infringement for using the Locke engine stop. This suit has now been decided in favor of the Locke Company by the United States Circuit Court for the District of Connecticut. The decision says, "it is impossible to detect infringement," and orders the bill dismissed. The company's customers are now freed from any further trouble of this kind.

The preliminary report on a proposed high pressure auxiliary salt water system for fire protection has been filed with the Board of Works, San Francisco, Cal. The system as at present outlined will protect an area of about 3000 acres, the mechanical equipment to include the installation of three pumping stations on the water front.

New York.

NEW YORK, April 24, 1907.

Pig Iron.—There have been some further sales of fair lots in this market and some good buying in New England for different deliveries. The spot market is somewhat ragged, and some close prices have been made for May and June, in which a Southern interest participated. We quote spot Northern Iron, $25.50 to $26 for No. 1 Foundry and $24.25 to $24.75 for No. 2 Foundry. For the second quarter we quote $24.50 to $25 for No. 1 Foundry, $23 to $23.50 for No. 2 Foundry and $22.50 to $23 for No. 2 Plain. No. 2 Southern Foundry is nominally quoted $26 to $26.50 for spot and $22.25 to $22.75 for the third quarter.

Steel Rails.—While there is some preliminary figuring on rail requirements for 1908 and the Pennsylvania Railroad is reported as about to provide for requirements of 153,000 tons, as against about 170,000 tons placed for this year, no sales for next year are yet reported by Northern mills. The mill at Ensley, Ala., it is understood, will not be in position to roll rails on new contracts for 1908, including about 50,000 tons already booked for next year, until some time in March. In the past week 4500 tons was bought by the New Orleans & Northwestern for 1907 delivery, and 3000 to 4000 by various lines, in scattering lots.

Structural Material.—While not booked ahead to the same extent as the plate and bar mills the structural mills are receiving a steady run of specifications. There is no heavy contracting for distant deliveries, as many contracts are already on the books for the full year, and there is no need of providing against the possibility of an advance in price. In the New York District the influence of the new Staten Island mill is not felt as yet, as that mill is now busy meeting the demands of the connected fabricating shops. In the past week a number of contracts have been placed, the largest being 5000 tons for the Pittsburgh Steel Company's new open hearth plant, taken by the Riter-Conley Mfg. Company, Pittsburgh. The American Bridge Company, among other orders, entered one for 1500 tons for a Philadelphia building, the Charles McCaul Company, Philadelphia, being general contractor. The same company took the contract for the new Masonic Temple, Washington, D. C., 900 tons, also that for the Delger Building, San Francisco, 1000 tons. Among railroad bridge work it booked were 1100 tons for track elevation for the Chicago Junction Railroad, Chicago, and 200 tons for the Baltimore & Ohio. Milliken Brothers, Inc., has the steel contract for the office and loft building of the Van Schaick Realty Company, at Fifth avenue and Fourteenth street, calling for 2000 tons. The New Haven road is about to ask bids on a considerable amount of additional street crossing work for its new six-track Harlem extension. Probably upwards of 4000 tons will be required. Apart from this, new inquiry from railroads is light, though for new manufacturing buildings or extensions of existing plants there is some preliminary figuring. In export work the principal business recently booked by the United States Steel Products Export Company is an extension for the Guanaca Centrale sugar mills in Porto Rico. Several hundred tons of Steel will be required. We continue to quote as follows for tidewater deliveries of mill shipments: Beams, Channels, Angles and Zees, 1.84½c.; Tees, 1.89½c.; Bulb Angles and Deck Beams, 1.99½c. On Beams 18 to 24 in. and Angles over 6 in. the extra is 0.10c. Sales are made out of stock of material cut to length at 2¼c. to 2½c.

Bars.—The demand for both Iron and Steel Bars is moderate. Manufacturers of Bar Iron are maintaining prices on the basis of 1.79½c. to 1.84½c., tidewater, the cost of production allowing little margin for making concessions. The consumption continues heavy, but buyers are purchasing cautiously. Steel Bars are strongly held at about the same prices as Bar Iron, but even the leading manufacturers are unable to promise delivery under six weeks to two months.

Plates.—Local business continues quiet, with inquiries far apart, and then only for small quantities. Quotations for tidewater delivery are as follows: Sheared Tank Plates, 1.84½c. to 1.94½c.; Flange Plates, 1.94½c. to 2.04½c.; Marine Plates, 2.24½c. to 2.34½c.; Fire Box Plates, 2.75c. to 3.50c., according to specifications.

Cast Iron Pipe.—A better inquiry is noted, although the demand is confined to small lots. New England is more in evidence in the market than for some time, but almost exclusively for extensions to existing works. One of the largest orders now in the market is for 2900 tons for Carthage, N. Y., on which bids will be opened April 29. Considerable interest is taken in the expected large demand which is to come from the city of New York, but thus far nothing definite has developed either with regard to the quantity required or the time when proposals may be called for. Prices are firm at $35.50 to $36 for 6-in., per net ton, at tidewater.

Old Material.—The Eastern market seems to be operating on a completely independent basis. While the reports from the West show that Scrap is quite generally neglected and prices have a downward tendency, Eastern trade movements display considerable activity and a maintenance of strength. About the only grade of Scrap manifesting weakness is Yard Wrought, which is in so little demand that in some instances dealers have shipped it to apply on contracts for Heavy Melting Steel. Of course, if this is done to a considerable extent the accumulations of Wrought will be so reduced that its price will again harden. Heavy Melting Steel is in strong demand, and sales of round lots have been made at full figures, both to consumers and to dealers who have contracts on which more rapid deliveries are being demanded. Good sales, running up to some large tonnages, have been made, at full prices, of various classes of foundry Scrap, as well as of Borings and Turnings, for deliveries extending through May, June and July. Rolling mills are taking fair quantities of the cheaper grades of busheling Scrap. From information at hand, the current demand in this locality appears to be fully as good as at any time for several weeks. Quotations per gross ton, f.o.b. New York, are as follows:

Old Girder and T-Rails for Melting	$16.00 to $16.50
Heavy Melting Steel Scrap	16.00 to 16.50
Old Steel Rails, rerolling lengths	18.00 to 19.00
Relaying Rails	27.00 to 28.00
Old Iron Rails	24.00 to 24.50
Standard Hammered Iron Car Axles	29.00 to 29.50
Old Steel Car Axles	20.50 to 21.00
No. 1 Railroad Wrought	18.50 to 19.00
Iron Track Scrap	17.50 to 18.00
No. 1 Yard Wrought, long	17.50 to 18.00
No. 1 Yard Wrought, short	17.00 to 17.50
Wrought Pipe	14.50 to 15.00
Light Iron	11.00 to 11.50
Cast Borings	12.50 to 13.00
Wrought Turnings	14.50 to 15.00
Old Car Wheels	22.00 to 22.50
No. 1 Heavy Cast, broken up	19.00 to 20.00
Stove Plate	16.00 to 16.50
Grate Bars	14.00 to 14.50
Malleable Cast	19.50 to 20.00

Charles P. Vanderveer has been appointed a member of the selling force of the Thomas F. Cushing Company, New York, dealer in wrought iron and steel pipe. On May 1 the company will move from the Fuller Building to 40 East Twenty-first street, where it will occupy the two lower floors and take up additional lines.

Witherbee, Sherman & Co., Incorporated, miners and shippers of Port Henry ores, will occupy their new offices on the thirteenth floor of the United States Express Building, 2 Rector street, on May 1.

Buell & Mitchell, 120-122 Liberty street, New York, announce the opening of their Boston office at 70 Kilby street, with Henry W. Nutt as its manager. Their business as contractors and experts in steel for building and bridge construction and for manufacturing purposes is enlarging so rapidly as to require this extension, which will enable them to give closer attention to the large requirements of their customers in the Eastern and New England States. Announcement is also made of their appointment as New England representatives of the Rogers Shear Company, Warren, Pa., for the exclusive sale of the output of concrete steel bars to which the works at Franklin are entirely devoted.

Metal Market.

NEW YORK, April 24, 1907.

Pig Tin.—There has been more activity in this market, especially in the matter of price changes, than for a number of weeks past, and although actual business only exceeded 100 tons one day in the week, the market looks stronger. On April 18 sales were made at 40.50c., the price advancing to 40.75c. on the following day. Private cables received from London Saturday, April 20, when ordinarily no cables are received, told of renewed strength in that market, and sales were made here at 41c. This strength was very apparent on April 22, when about 150 tons were sold at 41.40c. to 41.50c. On April 23 some business was done at 41.65c. The London market closes higher to-day, at £190 15s. for spot and £187 10s. for futures, and following this prices are firmer here, at 42c., or an advance of 1½c. during the week. The reason assigned for the strength of the market is covering by short operators, as the actual business transacted during the week was too small to account for the sharp advance, although consumers in this country are showing more interest in the market. The arrivals have been rather light, amounting to but 2210 tons, and there are afloat for American ports 2059 tons, of which at least 900 tons will make this month's delivery.

Copper.—There is more confidence among both consumers and sellers of Copper, although no large business has developed. A number of inquiries for prompt shipment of Copper have come from American consumers but scarcely any of these have been turned into orders. However, in Europe the situation is different, and sales of lots amounting from 100,000 to 200,000 lb. have been made on a basis of 24⅜c. to 24½c. for Electrolytic. These are all for nearby shipments. Some Lake Copper has been sold in this country and we revise prices as follows: For Lake, 25c. to 26c.; Electrolytic, 24.25c. to 25.25c.; Casting Copper is also firmer

and the market would be represented by 22.75c. to 23.50c. The larger selling interests adhere to the old quotation of 25¼c. for Electrolytic Copper, delivered 30 days, and express the view that they may be nearer right than some of the people who are persistently offering Copper at concessions, as it is well-known that the new mines have not come into the producing state as rapidly as was expected. This is especially true of the new property in the Ely District of Nevada, and also of the Utah camps. Consumers have little or no surplus to throw on the market, yet on the other hand they do not have to enter the market as buyers for some time, being well supplied with metal for eight to ten weeks ahead. A large amount of Copper will have to be bought for July deliveries, and when the buying movement does set in it is likely to be very active. With the more settled condition of the market now, the early resumption may not be as far distant as some seem to think. In spite of all the favorable news, it is true that many of the railroad companies, telephone construction companies and other large users of Copper are postponing plans for extensions during the near future, as they hope to secure metal at lower prices. It is only fair to state, however, that a prominent railroad company pursued this policy some eighteen months ago and was obliged later to enter the market and purchase metal at considerably higher prices. In London prices have again advanced, and the market closed to-day at £101 for Spot, and £100 15s. for Futures, while Best Selected is held at £109 10s. The export movement shows improvement, and the total exports so far this month amount to 13,268 tons. It looked for a few minutes on Tuesday as if there would be an actual transaction in Copper metal on the New York Metal Exchange. A member of the Exchange bid the outside prices quoted by the Exchange, 25c. and 24.50c., for both Lake and Electrolytic, respectively, for April, May and June deliveries. For Casting Copper 22.75c. was bid, which was the average price quoted on that Exchange, but even at these figures there were no actual transactions, nor does the official market report of the New York Metal Exchange make any mention of these bids. We learn of offerings of prime Lake at 25.50c. for prompt shipment from the West.

Lead.—There has been considerably more activity in the Lead market and several sales have been made on a basis of 6.10c., New York, for both spot and prompt shipment from the West. In St. Louis the market is unchanged, at 5.95c. It is rather interesting to note that a number of consumers of Lead who hastened to cancel their requirements for future delivery shortly after the stock market panic of March 14 have requested that these instructions be disregarded and the Lead shipped as rapidly as possible.

Spelter.—The Spelter market seems to be the dullest and weakest of any of the metals. Offerings on a basis of 6.60c., St. Louis, or 6.75c., New York, have failed to attract any considerable amount of business.

Antimony.—The market is still unsettled and quotations are largely nominal. Cookson's is held at 24c. to 24.50c., Hallet's at 22c. to 22.50c., while outside brands can be had at 20.25c. to 20.75c.

Ferroalloys.—The shortage of Ferrosilicon is marked and the high prices of $112 to $115 are paid for prompt shipments of 50 per cent. Deliveries during the second half can be had at lower figures, some prices as low as $104, New York, being named. For 75 per cent. Ferrosilicon the price is unchanged, at $150. An active demand is also noted for furnace brands, ranging from 11 to 12 per cent., and for these grades $32.50 to $34 is quoted. The activity in Ferromanganese has subsided, nearby shipments being obtainable at $69 to $71 and second half at $66 to $68.

Tin Plate.—The demand from consumers is large and contracts are being entered into freely for fourth quarter delivery. The price is unchanged, at $3.90, f.o.b. Pittsburgh, and $4.09, f.o.b. New York.

Old Metals.—Dealers' selling prices are more or less nominal, owing to the small amount of business. We quote:

	Cents.
Copper, Heavy and Crucible	22.00 to 22.50
Copper, Heavy and Wire	21.75 to 22.25
Copper, Light and Bottoms	19.50 to 20.00
Brass, Heavy	15.25 to 15.75
Heavy Machine Composition	18.25 to 18.50
Clean Brass Turnings	14.00 to 14.50
Composition Turnings	16.75 to 17.25
Lead, Heavy	5.75
Lead, Tea	5.45
Zinc Scrap	5.00

The world's coal production in 1906 is estimated to have been almost 1,000,000,000 gross tons, as compared with 930,000,000 tons in 1905 and 867,000,000 tons in 1904. Each year shows a gain upon the previous of about 7¼ per cent. The United States accounts for about 38 per cent. of the total; Great Britain for 25 per cent., and Germany for 18½ per cent.

Iron and Industrial Stocks.

NEW YORK, April 24, 1907.

The stock market for the past week can be characterized as dull, but strong. In some of the iron and steel stocks no transactions occurred during the entire period from Thursday to Tuesday. On such stocks as were at all active prices gradually appreciated, reaching higher figures on Monday and Tuesday than during the preceding days of trading. The range of prices on these stocks during the period referred to was as follows: United States Steel common 36⅝ to 38½, preferred 99⅞ to 101½; Car and Foundry common 36 to 37¾; Locomotive common 62⅝ to 64¼; Colorado Fuel 34½ to 37; Pressed Steel common 35⅝ to 37½, preferred 92 to 93⅝; Railway Spring common 43⅜ to 45¾; Republic common 28½ to 29½, preferred 85 to 85⅞; Sloss-Sheffield common 53 to 54; Cast Iron Pipe common 37 to 37⅝; Can preferred 57⅛ to 57⅝. Cast Iron Pipe preferred sold at 82. No sales were reported of Tennessee Coal. Cambria Steel ranged on the Philadelphia exchange from 36½ to 38¼. Crucible Steel preferred at Pittsburgh sold at 72. Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 37¾, preferred 101¼; Car & Foundry common 37½, preferred 99; Locomotive common 64, preferred 105; Steel Foundries common 8⅜, preferred 39; Colorado Fuel 36½; Pressed Steel common 37, preferred 93½; Railway Spring common 45¾; Republic common 29, preferred 85; Sloss-Sheffield common 54; Cast Iron Pipe common 37⅛, preferred 80½; Can common 6⅜, preferred 57¼.

Dividends.—The J. G. Brill Company, Philadelphia, Pa., has declared quarterly dividends of 1¾ per cent. on the preferred stock and 1 per cent. on the common stock.

The Pennsylvania Steel Company has declared a semi-annual dividend of 3½ per cent. on the preferred stock, payable May 1.

The Harlan & Hollingsworth Company, Wilmington, Del., has declared a quarterly dividend of 1 per cent.

Rails of most unusual length were exhibited at Liege, Belgium, some time ago. These included an 85-lb. grooved girder rail for street railroad track, 331 ft. long; a 70-lb. T rail of the same length, and a light T rail for portable railroad track, weighing only 7 lb. to the yard and 252½ ft. long. Each of the two large rails was made from a 5½-ton ingot, heated for 90 min. in the soaking pit to insure a uniform temperature throughout the mass. This was rolled in a mill having blooming and finishing rolls, driven by an engine of 10,000 hp. The rail was rolled in 5 min. to a length of 354¼ ft. To make it into a first-class rail, it was found necessary to crop off 23 ft., leaving it 331 ft. long. Owing to the restricted space in the mill, the rail, as it passed through the rolls, traveled up a steep inclined plane and over the top of a two-story building. When the rolling was finished and while the rail was still at a bright red heat, it was attached to a locomotive and hauled along the ground to a place where it could cool slowly.

Experiments in England with a 60-ft. torpedo launch propelled by internal combustion engines of the Napier design, built by Yarrow & Co., have demonstrated that such a boat can be depended upon for service under very adverse conditions. After considerable experimenting in smooth waters, the boat was taken out into the open sea and given a trial in very rough water. It covered 176 nautical miles (202 statute miles) in 7 hr. 11 min. The mean speed was 24.5 knots, or 28.2 miles per hour. There was a crew of six men. The petrol (gasoline) consumption during the run was 220 gal. As the tanks have a capacity for 350 gal. of fuel, it follows that the radius of action at full speed is about 280 nautical miles. The engine is stated to have run very well, not having been stopped from start to finish of the trial.

For supplying a high pressure to fire mains, a pumping station has been installed in the city of Toronto, in which multiple stage turbine pumps are to be driven by steam turbines. The maximum water pressure is to be 300 lb., so that the hose attachments may be connected direct with the hydrants, doing away with the use of fire engines. Each pump will be driven by a Westinghouse-Parsons steam turbine of 1100 hp., working with a steam pressure of 150 lb. and a vacuum of 26 in. The two turbine units have a joint capacity of 5,000,000 gal. per 24 hr. They are so arranged that they may be operated either alone or with the two in series.

The General Electric Company's Exhibit at Jamestown.

Although electricity plays a most important part at the Jamestown Exposition, the management felt it advisable not to set aside a separate building for electrical exhibits. Two principal exhibit halls have been built. One of these, the Machinery and Transportation Building, includes the exhibits of electrical machinery, and it is in this building that the main substation and distributing switchboard of the exposition are located. Inasmuch as all of the electrical apparatus in the substation, as well as that used by the exposition company around the grounds, was furnished by the General Electric Company, its exhibit has been confined to illustrating various industrial and domestic applications of electricity. This exhibit is located adjacent to the substation, and is filled with a most interesting variety of devices, many operated by electric motors.

One section has been fitted up as a model electric kitchen with a spacious dining room adjoining, which will be used as reception quarters for guests. In the kitchen is to be found an elaborate collection of the company's electric heating and cooking utensils. These will be in full operation during the exposition, and their convenience and durability will be amply demonstrated. The dining room is attractively fitted up in Flemish oak with dark red burlap wall covering, and contains a handsome mantel of Flemish design. Instead of the gas logs, a luminous electric radiator has been installed in the fireplace. In the ceiling of the dining room a comprehensive showing is made of the company's incandescent units, including the Gem units of various sizes, and the new Tantalum lamps, all equipped with various forms of Holophane reflectors.

One of the interesting features of this exhibit is the small refrigerating plant operated by an electric motor, so arranged that the refrigerating liquid passes through an adjacent section of the railing, which, of course, is covered by a heavy white frost. Another unique application of the electric motor is seen in the Seth Thomas clock with 24-in. dials in full operation, regularly wound by an electric motor. An electrically operated floor surfacer and polisher is worthy of comment. A motor driven washing machine attracts the housewife as much as the sewing machine operated by electricity. The electric cream separator is now quite generally used, and this company is furnishing the motors for driving an exhibition showing cows milked by electricity in another part of the grounds.

Up to date bakeries are now equipped with electricity for operating as well as lighting, and the electric dough mixer, shown by the General Electric Company, has proved a most useful device. Two designs of electric hair dryers are here exhibited, and the electric heating pad is also shown. The electrically operated circular saw and new form of electric bench drill, motor driven lathe and a small portable forge, fitted with electric blower, form an interesting part of the exhibit. There are also a number of small grinders, buffers and polishers for the use of jewelers and in small shops. Several types of ventilating blowers are shown, and the exhibit of ordinary electric fans is very complete. In fact, this promises to be one of the most useful parts of an exhibit located in the latitude of Norfolk.

The main part of the exhibit is illumined by G. E. inclosed arc lamps fitted with concentric diffusers. Edison incandescent lamps are used throughout for lighting the exposition buildings, and the General Electric Company exhibits this type of lamp as well as some of the other standard Edison lamps, with interesting information as to the annual production, &c., of these lamps.

As indicative of certain uses of the electric motor, an Edison business phonograph with shaving device is exhibited as a talking phonograph, all operated by small motors. The talking phonograph is used to explain the operation of the other phonograph and various devices in the exhibit. An electrically driven house pump is shown in operation, and an electric renovator in the form of a carpet sweeper forms an unusually interesting application of the electric motor.

The General Electric Company will also furnish for use about the exposition grounds more than a score of powerful electric searchlights, and in the exhibit made by the Navy Bureau of Equipment is to be found a small Curtis steam turbine of the type and size used on board ship. Here also this company is exhibiting its new electric fireroom timing device.

Programme of the Dealers' and Manufacturers' Joint Convention.

The programme for the concurrent meetings of the American Supply and Machinery Manufacturers' Association, the National Supply and Machinery Dealers' Association and the Southern Supply and Machinery Dealers' Association, to be held at the Hotel Sinton, Cincinnati, Ohio, on May 8, 9 and 10, is as follows:

On Wednesday morning at 10 o'clock will be an open session, at which, after the introductory remarks by E. E. Strong, president of the National Supply and Machinery Dealers' Association, and the usual prayer and singing of the national hymn, an address of welcome will be delivered by the Mayor of Cincinnati. Addresses will then be made by E. E. Strong, James A. Reichman, president of the Southern Supply and Machinery Dealers' Association, and Samuel L. Moyer, president of the American Supply and Manufacturers' Association, each of whom will dwell at some length upon the objects and aims of the associations and the difficulties to be met with and to be overcome in business. An address will next be delivered by T. J. Fernley, secretary and treasurer of the National Hardware Association, on "What Advantages Can Be Obtained Through Co-operation in the Trade?" George Puchta, chairman of the Joint Entertainment Committee, will then report, and the session will close by the announcement of the Conference Committee and impromptu addresses.

On Wednesday afternoon will be held the executive sessions of the three associations, which will include the president's address, reports of the secretary-treasurer, Executive Committee, Membership Committee, announcement of Nominating Committee and other routine business. There will be a theater party for the ladies and a boat ride in the evening.

The first joint executive session of the associations will take place Thursday morning at 10 o'clock, and at this session addresses will be delivered on "Resale Prices," by George V. Denny of the Georgia Supply Company, Savannah, Ga., George Puchta of the Queen City Supply Company, Cincinnati, Ohio; Charles F. Aaron of the New York Leather Belting Company, New York, and M. W. Mix of the Dodge Mfg. Company, Mashawaka, Ind. The subject of the addresses will then be open to discussion, each speaker being limited to five minutes. Addresses will also be made by John G. Doon of the Fairbanks Company, Baltimore, Md.; William J. McDowell of the McDowell, Stocker Company, Chicago, Ill., and J. H. Drury of the Union Twist Drill Company, Athol, Mass., on the "Relations Between the Dealer and Manufacturer." In the afternoon there will be another executive session of the associations, while a trolley ride will be arranged for the ladies to the Rookwood Potteries and the Cincinnati Art Museum. The evening will be devoted to the banquet.

The joint executive session on Friday morning will be given over to addresses and the discussion of "Cash Discounts" and "Cost of Doing Business." Papers will be read on the former subject by Phil. Pidgeon of the Pidgeon-Thomas Iron Company, Memphis, Tenn.; George T. McIntosh of the McIntosh Hardware Corporation, Cleveland, Ohio, and Willard Parker of the Pennsylvania Shafting Company, Spring City, Pa., and on the latter subject by E. A. Peden of the Peden Iron & Steel Company, Houston, Texas, and William H. Taylor of the Scranton Supply & Machinery Company, Scranton, Pa. At the close of the afternoon session, at which committee reports, election of officers and miscellaneous business will be taken up, the convention will adjourn.

PERSONAL.

Johan August Brinell of Stockholm, Sweden, who will receive the Bessemer gold medal for 1907 at the meeting of the Iron and Steel Institute in May, has dealt chiefly in his researches with the changes in texture on heating and cooling steel. He has also developed the well-known ball test for determining the hardness of metals.

James B. Laughlin, treasurer of the Jones & Laughlin Steel Company, Pittsburgh, has returned from a European trip.

Richard Peters, Jr., has been appointed purchasing agent of the Birmingham Iron Company, with office at 501 Woodward Building, Birmingham, Ala.

John W. Seaver, who with S. T. Wellman and the late Charles H. Wellman, formed the Wellman-Seaver Engineering Company at Cleveland, Ohio, about 10 years ago, and for several years has been a vice-president of the Wellman-Seaver-Morgan Company, resigned his official position with the company this month. He has opened offices as consulting engineer in the Caxton Building, Cleveland, and will devote himself to the design and construction of manufacturing and power plants, iron and steel foundries and machinery for handling material.

W. J. McBride has resigned as first vice-president of the American Car & Foundry Company, to become manager of the Haskell & Barker Car Company, Michigan City, Ind. Edwin F. Carry, Chicago, heretofore second vice-president, has been made first vice-president of the American Car & Foundry Company.

A. T. Drysdale has been appointed general manager of the Sheffield Cast Iron Pipe & Foundry Company, Sheffield, Ala. The statement recently made in these columns that W. T. Archer had been appointed to this position is an error. Mr. Archer is assistant to the president, J. W. Worthington.

Charles S. Price has been elected a director of the Cambria Steel Company, vice J. W. Townsend, resigned, and also a vice-president. He has been the company's general manager, and will retain that position in addition to that of vice-president. Alexander P. Robinson, formerly treasurer and assistant secretary, has been elected second vice-president. Edward T. Stuart, formerly assistant treasurer, was elected treasurer and assistant secretary. Louis K. Kruse has been elected assistant treasurer.

Walter J. Drummond, of M. J. Drummond & Co., 182 Broadway, New York, sailed for Europe on the Cedric April 19 for the purpose of making a tour of England, in the course of which he will visit a number of leading industrial establishments.

A. A. Fowler, of Rogers, Brown & Co., New York, sailed for Europe on Tuesday.

Alba B. Johnson of the Baldwin Locomotive Works, Philadelphia, sailed from New York April 23 for a three months' trip abroad.

E. M. Peters, formerly general superintendent of the blast furnaces of the United Iron & Steel Company at Leetonia, Ohio, and West Middlesex, Pa., has been elected secretary and assistant treasurer of the company, and will have his headquarters in its general offices in the People's Bank Building, Pittsburgh.

C. E. Dinkey, manager of the Edgar Thomson Works of the Carnegie Steel Company, has been elected president of the Board of Trustees of the Carnegie Library at Braddock, Pa., succeeding Thomas Morrison, resigned.

Thomas Morrison, formerly general superintendent of the Edgar Thomson Works of the Carnegie Steel Company at Bessemer, and now a director of the United States Steel Corporation, has sailed for Europe.

J. S. Watson, manager of the drive chain department of the Link-Belt Company, Philadelphia, sailed for Europe to-day on the Amerika. While abroad he will visit the chain making plant of Hans Renold at Manchester, England.

J. A. Durfee, assistant manager of the Minnequa Works of the Colorado Fuel & Iron Company, has accepted the position of general manager of the Atlanta Steel Company, Atlanta, Ga., the change taking effect on May 1. John H. Means will succeed Mr. Durfee as assistant manager at Pueblo, and W. S. Hutton, who has been assistant to Mr. Means, will succeed the latter. Arthur W. Taylor, who has been connected with the open hearth department at Pueblo for the past year, has accepted a similar position with the Atlanta Steel Company.

On the 19th inst. it was just 40 years since John A. Walker, now the vice-president, first became connected with the Dixon Crucible Company, Jersey City, N. J.

OBITUARY.

THOMAS VENNERS, an iron manufacturer of many years' standing, died April 18 at the home of his daughter in Brooklyn, N. Y. He was born near Birmingham, England, in 1823, and went to work in a rolling mill when a boy. In 1859 he was made superintendent of the Round Oak Iron Works, Staffordshire, owned by the Earl of Dudley. Ten years later he came to America and built a rolling mill at Portsmouth, Ohio. Later he took charge of the rolling mill of the Baltimore & Ohio Railroad Company at Cumberland, Md., resigning in 1875 to become the superintendent of the Keystone Rolling Mill, Pittsburgh. Mr. Venners was the inventor of many processes connected with the manufacture of iron. One of the most interesting of these was a method for rolling tapered bars. He retired from business in 1892.

Labor Notes.

The officers of the National Founders' Association announce through the *Review*, the monthly publication of the association, that the contract between the association and its members whose shops are involved in strikes will continue for a period of one year after the union either nationally or locally calls off the respective strikes. The announcement is made in view of inquiries from striking union molders who desire to return to work. The language of the contract is as follows: "For a period of one year from the date on which said strike is declared off, or on which it ceases to interfere with the continuous conduct or carrying on of the business of said company, the said company shall and will conduct and carry on its foundry strictly on the open shop plan."

The National Metal Trades Association has arranged that the territory of the Boston branch shall hereafter include the counties of Essex, Middlesex, Norfolk and Suffolk, and that the counties of Bristol, Plymouth, Barnstable and Dukes in Massachusetts, also the State of Maine and the State of New Hampshire, except Cheshire and Hillsboro counties, shall be under the jurisdiction of the Boston branch.

Although the lodges of the International Association of Machinists in New York City voted some time ago to make a demand this spring for an 8-hr. day no such issue has been presented to the employers as yet, and it is not expected the national officers of the machinists' union would sanction a strike for 8 hr. in view of the fact that 9½ and 10 hr. days are being worked in a considerable number of New Jersey shops.

The Manufacturers' Association of Pittsburgh announces that, effective April 22, wages of machinists, pattern makers, molders and core makers employed by members of the association have been advanced as follows: Machinists, 2½ cents per hour; pattern makers, 1½ cents per hour; molders and core makers, 1½ cents per hour.

Moorhead, Brother & Co., Incorporated, Pittsburgh, have raised the wages of their puddlers from $5 to $5.75 per ton.

Spang, Chalfant & Co., Pittsburgh, operating the Etna Iron & Tube Works, have advanced puddlers' wages from $5.25 to $5.75 per ton.

The Machinery Trade.

NEW YORK, April 24, 1907.

There was considerable more activity in the machinery trade the past week, both orders and inquiries coming in in greater volume. A few weeks ago a slackening up of inquiries was noted, and at that time it was feared by some that a downward course of business had started, but the turn for the better has dispelled any apprehension felt for the immediate future. At the present time there appears to be no indication of a change in the great demand for machinery, the only difficulty being the inability to secure machines. The increase in inquiries and orders has been mainly from industrial companies, the railroads having not come into the market lately for large lots. Some of the Western roads, however, have placed orders for air compressors and other heavy machines. The buying of compressors is usually followed by the purchasing of machine tool equipment, and the sale of these machines is to a degree an indication of the course of business. In this connection it is of interest to note that the sales of the compressor department of the Chicago Pneumatic Tool Company for March were the largest of any month in the history of the company, and April business bids fair to exceed the record month.

There has been a decided increase in the demand for parts of machinery from machine tool makers and engine builders of late, and many shops now rushed with orders are obliged to turn their attention to getting out parts for repairs for machinery that are needed for immediate use. A representative of a prominent company which builds engines and other equipment states that this unusual demand is due to the fact that nearly every manufacturer in the country has been using equipment overtime, and in some cases machines have been in almost constant use night and day for the last year. It is necessary for manufacturers of machinery to take care of their old customers in this respect, and consequently new orders have been held up in many cases to give way to the production of extra parts. It must not be inferred from this that defective machinery has been put on the market, as those making the demand for parts have, as a rule, made no complaint and have agreed that breakages have resulted from an unusual wear and tear on the machinery.

The recent agitation for cheaper denatured alcohol, which resulted in a reduction of the revenue tax imposed on that product, has aroused interest in equipment for producing alcohol, as well as in the alcohol engine field. Up to a year ago the number of alcohol engines made in this country was very small and there were no companies making a specialty of that line, but now no less than five manufacturers of small engines who formerly gave their attention to gasoline and kerosene oil burning engines are preparing to build alcohol engines of various types, while manufacturers of distilling apparatus are increasing their facilities for turning out equipment for distilling denatured alcohol. This activity will bring about a demand for machinery on the part of these manufacturers, and before long the trade will no doubt hear of requirements for machinery in that line. *The Iron Age* has of late received numerous inquiries for information regarding the manufacture of denatured alcohol and for addresses of those making alcohol engines, all of which goes to indicate that later on there will be a lively demand for that class of equipment.

Orders which were cancelled some months ago for Cuba, mostly in the line of equipment for sugar plants, seem to be coming in now, and engineers and exporters who are close to the Cuban trade think that conditions on the island are settling down enough to permit a resumption of the really good business that existed between this country and Cuba before the recent outbreak. An engineer who is close to the Cuban trade recently made a comparison of English, German and American prices and delivery terms, with a view to placing several orders for power equipment to be added to Cuban plantations, with the result that he decided that terms offered here were more advantageous, notwithstanding the fact that American manufacturers were crowded with work. He declared that the equipment offered here was better and the nearness to the point of delivery gave American manufacturers some advantage, even though prices demanded by American builders were somewhat higher than foreign competitors. The difference in efficiency gave dealers here the advantage.

The apprentice question will form an important part in the deliberations of the National Machine Tool Builders' Association at the spring meeting, Old Point Comfort, May 14 and 15. The committee headed by E. P. Bullard, Jr., Bullard Machine Tool Company, Bridgeport, Conn., made a report at the meeting a year ago, and the matter came up for further discussion at the annual meeting in New York. The committee was instructed to investigate the subject in still greater detail, and the results are looked forward to with much interest. The question has become more and more an important one with the rapid increase in business and the consequent inability to secure competent workmen. Another topic which may come up for discussion is that of cost systems in the machine shop, a subject that was brought forward at the Atlantic City meeting.

Grand Trunk Railroad Machinery Requirements.

The Grand Trunk Railroad, A. Butze, purchasing agent, Montreal, has sent out under date of April 18 a list of machine tools, part of which are for the Montreal shops and the remainder for the shops at Stratford. The Montreal list comprises the following machines: 43-in. wheel lathe; 20 in. by 12 ft. pattern makers' lathe; four 16 x 36 in. tool room lathes; 16-in. monitor lathe; 24-in. turret lathe; Gridley automatic turret lathe; 30 in. by 6 ft. engine lathe; 5-ft. universal radial drill; 20-in. upright drill; 24 in. by 7 ft. pony planer; 20-in. hand planer; 48 x 48 in. x 72 in. planer; No. 3 universal milling machine; No. 4 universal milling machine; ring and circle shears; power press; universal saw bench; 36-in. band saw; 84-in. boring mill; 12-in. slotter; Sellers grinder; 1100-lb. steam hammer; three-spindle wood boring machine; twist drill grinder; 400-ton hydraulic wheel press. The list for the Stratford shops follows: 48 x 60 in. x 84 in. planer; 36 x 36 in. by 10 ft. planer; 20-in. cabinet turret lathe; 18-in. monitor lathe; double car axle lathe; 24 in. by 15 ft. engine lathe; two 20 in. by 5 ft. lathes; three 16 x 30 in. bolt lathes; 3-in. Gridley automatic turret lathe; two 36-in. boring mills; two 8-ft. boring mills; 48-in. boring mill; two 1500-lb. steam hammers; 1100-lb. steam hammer; 20-in. upright drill; 28-in. drill; 36-in. drill; 72-in. universal radial; 60-in. universal radial; No. 2 cylinder boring machine; 18-in. slotter; 15-in. slotter; 14-ft. bending roll; universal tool room grinder; surface grinder; 24-in. traverse shaper; 3-in. nut-facing machine; air compressor; No. 3 universal milling machine; 5-in. centering machine; hydraulic pump; 1½-in. triplex bolt cutter; heavy single spindle wood boring machine; power hack saw; single punch and shears; universal tool grinder; steel pressure blower.

Extensive improvements are to be made to the West Albany shops of the New York Central Railroad, which will call for a large expenditure for machinery equipment. The additions will consist of new shops for the locomotive department, including an erecting shop and a boiler shop, while some additions are to be made to the present tank shop. The total expenditure for the additions will amount to about $300,000. The erecting shop will be 90 x 441 ft., and the boiler shop 125 x 385 ft. The appropriation for the new shops comes out of the money that was set aside last year for extension purposes. Work will be begun on the improvements at once and it is expected that they will be concluded during the summer, and the buying for mechanical equipment will no doubt be begun soon. Additions are also to be made to the power equipment for these shops, but those details have not been worked out as yet. All the details are being attended to from the company's New York office. In this connection it may be added that the company contemplates no additional large extension work at present, as, in keeping with its announced policy, expenditures in that line are being kept down, and only much needed additions to plants will be made for some time at least.

The Silliker Car Works.

Plans have about been completed and construction work started on the new plant to be erected at Halifax, N. S., by the Silliker Car Company, which has been incorporated with a capital stock of $500,000. Silliker & Co., Amherst, N. S., are the main factors in the new enterprise, and the members of this firm will manage the new works. This firm has a large woodworking plant at Amherst, which is to be moved to Halifax, and to which is to be added the department for the manufacture of freight cars. The plant is to consist of a woodworking shop, 75 x 200 ft., with dry kiln, paint shop and warehouse; car shop, 80 x 160 ft.; machine shop, 75 x 150 ft.; blacksmith shop, 75 x 125 ft.; molding shop, 75 x 200 ft.; erecting shop, 100 x 300 ft., and a central power house. These buildings will be equipped with modern tools, all machines to be motor driven. The plant is being erected on a site of 25 acres, and will cost when completed about $200,000.

A large plant for the manufacture of tapping machines, valves and general supplies for water works, is to be built at East Orange, N. J., adjoining the plant of the Sprague Electric Company, by the A. P. Smith Mfg. Company, Newark, N. J. This company now has a plant on Passaic avenue at the foot of Brill street, which has been found inadequate for the company's manufacturing needs. The plant will include a building 50 x 215 ft., for storage, office, foundry and storeroom. The foundry section will be one story in hight and the office and other sections of the structure will be two stories. This building will be of reinforced concrete construction. There will be a pattern storage building, three stories in hight, of brick mill construction, which will be 45 x 90 ft., and a power-house of reinforced concrete of an irregular shape, of approximately 40 x 60 ft. About 150 kw. of power will be generated in this building. There will be

a casting storage and cleaning building, 50 x 100 ft., and a one-story machine shop of steel construction, 100 x 155 ft. Plans for the two latter buildings are being drawn by the A. P. Smith Mfg. Company, and the designs for the other structures are being made by Fred A. Phelps, 15 Clinton street, Newark. We are informed that the machinery details have not been worked out as yet, nor have contracts been let for the buildings. The question of equipment, it is understood, will not be taken up for several weeks.

Machinery is being purchased by the Daimler Mfg. Company to equip the new plant it is to build to take the place of the one which was destroyed by fire last February. While it is thought that the company has not yet secured all the machinery it will require it has placed orders with several of the houses in this city, the aggregate of the orders amounting to a considerable sum. The company's works at Astoria, L. I., were completely destroyed by the fire, and the loss was estimated at about $400,000. For some time the company has been preparing to rebuild its plant, and owing to the large demand for its products it is probable that the new works will be much larger than the old, and will necessitate the installation of a large amount of machinery.

Some buying has been done in this market within the past few days by the Standard Oil Company, which is purchasing equipment for its shops at Buffalo, N. Y., where it manufactures tank cars. We understand that these shops are to be considerably enlarged and that the company is preparing to buy considerable more machinery for equipping the additions. The buying is being done from Buffalo.

Plans for the large warehouse to be built at Newark, N. J., by the United States Steel Corporation for the Carnegie Steel Company, indicate that the conveying machinery, and especially the electric traveling crane trade, will be largely benefited through the construction of the plant. The specifications show that in the main warehouse alone there will be no less than 12 10-ton traveling cranes and the same number of 3-ton traveling cranes. These are for indoor work in this warehouse alone. The bar storage warehouse will also require some cranes and other conveying machinery, and it is expected that there will be a fair number of outdoor cranes needed.

The contract for the construction of the first section of the subway loop between the East River bridges has been awarded to the Degnon Contracting Company, New York, at its bid of $2,952,000 for the tunnel construction and $83,000 extra for building pipe galleries.

The Hooven, Owens, Rentschler Company has closed orders for the following engines: A 250-hp. simple engine for the Tempest Knitting Company, Perry, N. Y.; 300-hp. direct connected engine, Reeves Bros., Alliance, Ohio; 500-hp. cross compound engine, Reading Paper Mills, Reading, Pa.; 150-hp. engine, L. S. White, Union City, N. Y.; 300-hp. simplex fan engine for mine work, Delaware & Hudson Coal Company, Scranton, Pa.

Business Changes.

Hill, Clarke & Co., Boston, Mass., dealers in machine tools, who, it was announced in these columns some time ago, were to move their New York offices from 153 Greenwich street to 132 Liberty street, have changed their plans and have leased a store at 136 Cedar street, in the new West Street Building, where the offices will be moved this week. The new store affords ample space for the display of sample machines of the various lines carried by the company.

Peter A. Frasse & Co., New York, have appointed the W. M. Pattison Supply Company, Cleveland, Ohio, and the Charles A. Strelinger Company, Detroit, Mich., Western distributers for Poldi high speed steel, for which Frasse & Co. are the sole American agents.

Chicago Machinery Market.

CHICAGO, ILL., April 23, 1907.

Trade conditions in the machinery market afford no cause for dissatisfaction or complaint. While the past few weeks have developed fewer inquiries and orders from the railroads and allied sources, sales are on the whole quite satisfactory. Dealers find no difficulty in selling tools they can furnish without delay. Indeed it is evident that if manufacturers were able to get tools in time for use in relieving present overtaxed shop capacities sales would be largely increased. A dealer, in commenting on the readiness of users to take good tools for prompt delivery, cited a transaction just closed in which a manufacturer, having received four large tools that for lack of space could not be put into service, asked the dealer to take them off of his hands. A half an hour at the telephone was all the sales effort required to dispose of the lot to four separate buyers. Not much betterment in deliveries is noted. While some gain in the reduction of accumulated orders is being made in certain lines, nearly all the principal makers are as far behind with shipments as they have been at any time for months past. Under the circumstances the machine tool business as a whole has not suffered from the withholding of purchasers on a few large requirements that were submitted for bids some time ago. On the contrary it seems that more of benefit than harm will accrue from the further increase of congestion that the accession of this business would naturally have produced. From the best information obtainable it appears certain that a considerable part of several railroad lists now held up will before long be placed. The demand for motive power equipment of all kinds is good, though in some directions it is perhaps not crowding as strenuously as it was a while back. The present extraordinary demand for boiler plate and tubes would indicate a large degree of activity in the boiler shops; and engine builders are not lacking orders sufficient to keep their works busily engaged. Warnings against overexpansion are being widely voiced by bankers and financiers, and though manufacturers generally see no hurtful depression ahead there is a growing tendency toward more conservative practice, which in itself will go far toward counteracting the effects of a diminished demand when it does come.

The National Mfg. Company, Sterling, Ill., has completed plans for a new three-story and basement factory, 100 x 200 ft., to which will be added a power house, 15 x 40 ft. Boilers and power machinery equipment will be required, together with other tools and machinery. No contracts have as yet been let, but it is understood that plans are completed and work will be actively begun in a short time.

The plant of the De Long Machinery Company, Morrilton, Ark., recently destroyed by fire, will be rebuilt at once, and the company will within a short time be in the market for a complete equipment of machinery tools.

Plans have been completed for a new building to be erected by the Marshall & Huschart Machinery Company, 62 South Canal street, Chicago. The new building, which will be located at 84 South Jefferson street, will be eight stories in hight, of reinforced concrete construction and as nearly fireproof as it is possible to make it. All floors will be designed to carry unusually heavy loads, and are intended for the occupancy of machinery dealers and manufacturers. The Marshall & Huschart Machinery Company will occupy the lower floors as sales and warerooms for its line of machine tools. The building will be lighted, heated and furnished with power by a battery of boilers and electric plant that will be installed in the basement. The boiler battery will include three 150-hp. tubular boilers, and engines and generators will be of sufficient capacity to furnish electrical power to operate manufacturing plants throughout the building. Powerful freight elevators large enough to carry 10 ton loads will be required, together with suitable pumps and other machinery necessary for an up to date building of this character. No contracts, either for building or equipment, have been let, but it is the purpose to push construction to completion as rapidly as possible, and the plans and specifications will be submitted for figures without delay. The company has opened offices and warerooms at 908 and 910 North Second street, St. Louis, Mo., where it will carry in stock a representative line of machine tools. The addition of these salesrooms will give it increased facilities at St. Louis for the prompt execution of orders, and will afford better opportunity to display tools.

The plant of the Marietta Iron Works at South Chicago, Ill., which is now vacant, has been secured by the Bidwell Electric Company, 133-139 South Clinton street, Chicago, for the manufacture of its line of motors, generators and refrigerating machines. Repairs and alterations are now being made to fit the plant for the company's work, and it is expected that it will be ready for occupancy about May 15. Some of the machinery equipment has already been bought, but additional machinery tools, such as lathes and planers will be required; also new boilers of 400 hp. capacity, with a corresponding engine unit. The business of the company has outgrown its present quarters, and a rapidly increasing demand for its new refrigerating machines has made larger shop capacity a necessity.

The Independent Light & Power Company, Davenport, Iowa, is preparing to build a new electric light and gas plant, the plans for which have been approved by the City Council. The engineers are now engaged in preparing specifications for the material and machinery required in the construction and equipment of this plant, and will soon be ready to receive proposals. C. J. Von Maur is president; Wilson McClelland, vice-president; Geo. M. Bechtel, secretary, and Julius C. Haslen, treasurer.

In order to supply additional power to meet the growing requirements of its electric light plant, the Board of Public Works of Marquette, Mich., has decided to install a steam turbine generating set with a capacity of 300 kw., together with the additional electrical appliances and equipment re-

quired by the 30 per cent. increase in capacity which this installation represents.

Bids are being asked by the County Supervisors of La Salle County, Ottawa, Ill., for the erection of a new power house and a 100-hp. boiler. Bids for the building and boiler will be received separately, and should be addressed to D. L. McKenny, county clerk.

The city of Athens, Ohio, is in the market for one 125-hp. high speed engine, one 75-kw. alternating current generator, a 50-light current transformer and regulator, together with some electric appliances and supplies. A. R. Bell is superintendent of the municipal light plant for which this equipment is required.

The Norton Company and the Norton Grinder Company, Worcester, Mass., for whose product the H. A. Stocker Machinery Company has been Western sales agent, are establishing independent sales offices and warerooms at 48 South Canal street, which they will occupy about May 1. These offices will be occupied conjointly by the above named companies and the Cleveland Twist Drill Company, now located at 17 South Canal street. As a result of the change the H. A. Stocker Machinery Company has arranged to represent the Abrasive Material Company as sales agent for Chicago and adjacent territory. The latter company, whose office and salesroom is now at 54 Randolph street, will be removed to 20 South Clinton street, where it will occupy quarters with its agent.

The Green Fuel Economizer Company has found it necessary to remove its Chicago office from the Monadnock Block to the Old Colony Building, in order to secure more room.

On May 1, the A. D. White Machinery Company will remove from 39-41 South Canal street to 19-23 South Jefferson street, Chicago, where 10,000 sq. ft. of additional floor space has been secured to accommodate its stock of new and second hand machinery.

The Star Foundry Company, Albert Lea, Minn., a company recently organized for the manufacture of blacksmith tools and to do general machine work, is in the market for one 20-in. drill press and one 5-hp. motor.

New England Machinery Market.

WORCESTER, MASS., April 23, 1907.

The business transacted by the machinery dealers during the past week has been such as to sustain the entirely hopeful attitude as to the future which has prevailed for the past few weeks. All report a very satisfactory condition of trade, orders being small as a rule but in the aggregate constituting a considerable volume of business. Some nice lists are being figured, none of them large, but large enough from the standpoint of the dealers. The railroads have not begun to make the purchases which they were supposed to have in contemplation for this season. Nothing further has been announced concerning the $250,000 addition to the Boston & Albany repair shops at Springfield, and the Boston & Maine shops at Somerville appear to have dropped out of sight for this season, though there is no official word to that effect. Neither has the Central Vermont announced detailed plans for a new shop at the southern end of its system.

The machine tool builders express themselves satisfied with their orders and inquiries. In several instances the past week has been as large as anything for months backs, including a first rate lot of foreign orders, though probably the proportion of business from abroad is no greater than has been offered during similar periods of recent months. A few machine tool manufacturers report a slight reduction in their totals of business as compared with the best months of 1906, but in these instances little gain is being made in deliveries. Whatever slacking up there may be is believed to be due for the most part to the condition of deliveries, which discourages users of machinery who would otherwise be quick to place their orders. A number of such cases are known in the trade, and doubtless there are many others. The classes of industry which use machine tools are apparently just as busy as ever, or at least as busy as they wish to be. Certain manufacturers of textile machinery are not booking orders in the same great volume as they have at times during the past year, but they state that they have all the business they want, and are relieved to see the demand drop a little that they may overcome the congestion which has been wrought in their order books.

The expression is frequently heard from builders of all classes of machinery that they would welcome a gradual tapering off, to a point at which deliveries would be not more than 60 days. There is a feeling that the gradual drop would preclude the possibility of manufacturers becoming alarmed, as might be the case if the drop were a sudden one, even though it were only to what could conservatively be called normal. The manufacturers have had so long a period of too much business that to get down to quick deliveries might make some of them uneasy. As a matter of fact, a return to enough business to keep works running full, with no orders booked for delivery more than two months ahead, would mean a greater production than there was 15 months ago, when deliveries were getting far into the future, the reason being, as was pointed out last week, that capacity to-day is far greater than it was then. Probably the gradual decrease has begun, but it is so slight in the aggregate that if deliveries should improve that fact alone would put conditions back again to where they have been.

Although this is the off season for buying among the automobile manufacturers, some of them are placing orders for machine tools, that they may be certain of deliveries in the autumn, instead of waiting until summer, which would be soon enough to consider the question of equipment were deliveries normal. Orders for machinery that may be classed as special must of course be placed early, especially at this time when machine tool builders are fighting shy of everything excepting their most demanded regular lines. In fact, it is practically impossible to get some of the machine tool builders to touch a special machine, no matter what price is offered.

Satisfaction is expressed that a temporary arrangement has been made between the United States and Germany for the extension of the privileges of the minimum tariff on American goods imported into Germany. The Reichstag must ratify the agreement before it becomes operative, but it is believed that this will be accomplished. Otherwise June would see the end of the present tariff relations between the two countries until another treaty could be arranged. Germany expects some return for minimum tariff privileges extended to the United States. One extension of the old agreement has already been granted, and a second temporary modus vivendi has become necessary because the American government was unable to bring about the necessary action at Washington.

The State of Connecticut contemplates the establishment of a large trade school at Norwalk, Conn. The town is asked for a free site and an appropriation of $75,000 as its share in the project.

The iron foundry business of B. H. Fry & Co., Waterbury, Conn., has been incorporated as the Waterbury Foundry Company, with a capital stock of $40,000. It has a Connecticut charter, and the incorporators are B. H. Fry, A. A. Tanner, Thomas Garrigan and J. S. Neagle. The company will continue the business of B. H. Fry & Co., as manufacturer of medium and low grade iron castings, and will do some gray iron business in addition to what has been produced. An addition, 26 x 75 ft., will be built to the present foundry building.

The Central Oil & Gas Stove Company, Gardner, Mass., manufacturer of oil stoves and heaters, is to begin the manufacture of automobiles. An addition, 60 x 100 ft., recently completed, will be devoted to the purpose. The company states that it already has the equipment to make all the parts usually produced by automobile manufacturers. If special machinery is later added, the company will probably build it, as has been its custom with machinery in the past.

The New Home Sewing Machine Company, Orange, Mass., is to increase largely the manufacturing facilities of its plant by the erection of a new building, 40 x 200 ft., four stories and subbasement. The building will permit of a necessary increase of manufacturing equipment, to permit the company to relieve the present congested condition of the business.

The Union Metallic Cartridge Company, Bridgeport, Conn., is to erect two new manufacturing buildings. One will be 50 x 230 ft., four stories, and the other 50 x 150 ft., two stories. The company states that it is not in the market for new equipment.

The Turner Tanning Machine Company, Peabody, Mass., whose plant was recently destroyed by fire, is to erect a new building, 80 x 100 ft. The company states that its list of new equipment, replacing valuable machinery destroyed with the building, is not yet ready for the trade.

J. J. Adams & Co., Cambridge, Mass., brush manufacturers, are to erect a new factory building, 40 x 88 ft., three stories. The building will require new machinery adapted to this line of business.

Clayton Bros., Inc., Bristol, Conn., shear manufacturers, are to erect two new buildings, 40 x 48 ft. and 20 x 40 ft., respectively, one for storage and sorting room, the other to increase the output of castings.

The Manville Bros. Company, Waterbury, Conn., manufacturer of wire and metal working machinery, has increased its capital stock from $10,000 to $30,000. The purpose of the new capital is to enlarge the business.

Robert G. Pratt, Worcester, Mass., has established a shop for the manufacture of repair parts for narrow fabric looms at 100 Beacon street, Worcester. He has purchased the equipment necessary for starting in business.

The strike of the teamsters at Boston has ceased to be a serious matter to those machinery dealers whose trucking houses are affected. While the strike is still in progress, the employers have succeeded in filling the places of their men, with results which have relieved the congestion incidental to the beginning of the trouble.

Cincinnati Industrial Notes.

CINCINNATI, OHIO, April 23, 1907.

Fred Geier of the Cincinnati Milling Machine Company has assumed the presidency of the Bickford Drill & Tool Company, Cincinnati, Ohio, and F. M. Huschart, formerly of the Marshall & Huschart Machinery Company, has been appointed general manager and assistant to the president.

The S. Obermayer Company, Cincinnati, Ohio, is equipping its plant with an entirely new power outfit, operating from one central station. The new motive power consists of a 24 x 48 Corliss engine, together with the requisite battery of boilers. The company is also adding to its factory capacity by the erection of a new two-story brick structure, 55 x 55 ft., and adding two additional stories to the building adjoining, giving a third more productive capacity.

The John J. Bruce Foundry Company, Cincinnati, Ohio, now located on Kenyon avenue, has purchased a tract of land on the west side of Colerain avenue, between Queen City avenue and Draper street, having a frontage of 150 ft., and a depth of 400 ft., upon which will be erected a concrete and cement structure, 100 x 150 ft., 30 ft. high, for foundry purposes. Other buildings will also be erected. The site chosen adjoins that of the new plant, now under way for the Mueller Machine Tool Company, and in a district embracing over a dozen other machine tool manufacturing establishments.

The Board of Public Service of Hamilton, Ohio, has decided to erect two 4,000,000 gal. pumping engines instead of one 6,000,000 gal. as originally contemplated. The Laidlaw-Dunn-Gordon Company of Cincinnati, was the lowest bidder at $31,700 for both pumps.

The Kern Machine Tool Company, Cincinnati, Ohio, although in possession of its new plant for but a few months, has found the demand for its upright drills so excessive as to necessitate relinquishing the production of some of its other machine tools. The patterns and right to manufacture the Streit pulley lathe have been sold to the Cincinnati Pulley Machinery Company, although it was one of the company's most popular products. The new addition to the present plant, referred to in these notes recently, cannot be erected as early as was expected, but it will be an accomplished fact as early as is practicable.

Incorporation papers have been filed for the Columbus Malleable Castings Company, Columbus, Ohio, with a capital stock of $250,000. The new organization will take over the plant formerly occupied by the Columbus Malleable Iron Company. Interested in the new company are C. H. Boardman, C. Christopher Born, J. D. Ellison, J. D. Price, D. H. Taft, E. O. Cope, H. S. Newman, and others. Mr. Boardman will probably be president, and Mr. Cope, who is a Cincinnati man, secretary. H. S. Newman, who has been identified with several local iron companies, will be general manager.

Another acquisition to the machine tool interests of Cincinnati is the Cincinnati Pulley Machinery Company, which has purchased the patterns and rights of the well known Streit pulley lathe, boring machines, and tapping and drilling machines from the Kern Machine Tool Company. The new company will be organized with a capital stock of $15,000, with L. B. Patterson as president; J. George Hey, vice-president. Mr. Hey, who will also be general manager, has been connected for a number of years with the American Tool Works Company. The new company has secured the premises at 118 and 120 West Second street, 40 x 120 ft., where is now being installed as rapidly as possible all of the requisite equipment, and it is expected that operations will be commenced May 1. Some few additional tools will be required, and an additional 10 hp. motor is needed.

Philadelphia Machinery Market.

PHILADELPHIA, PA., April 23, 1907.

It is rather difficult to gauge exact conditions in the local machinery market. In the majority of cases business during the past week was not so active as the week previous, while in other instances buying has been fully maintained. On the whole the trade is fairly well satisfied with the way buyers are placing orders, although the undertone of the market could be much stronger. Confidence in the general situation has improved, but not to such an extent as to bring about any demand for extensive equipment. The ability of some manufacturers to make better deliveries of tools has helped the situation to some extent, and dealers report quite a few sales direct from stock, which would, no doubt, have been held up had extended time for delivery been necessary. Practically all of the orders placed recently have been those of the single tool variety; here and there a few tools, mostly of the smaller sizes, have been sold for minor shop equipment or extension. Some interest has been aroused by the recent orders placed in this country by Japan, but very little of this business, outside of an order for 22 locomotives placed with the Baldwin Works, has been taken by manufacturers in this territory.

The railroads are buying but few tools, and nothing has yet developed from the recent extensive inquiries for equipment by the Baltimore & Ohio Railroad. The Standard Cast Iron Pipe & Foundry Company, whose orders for quite a round lot of tools for its new Bristol, Pa., shops have been expected to be given out almost daily, has not yet placed the business, although it is now confidently expected by the trade that at least part of the order will be placed before the end of the week.

Manufacturing plants continue fully occupied. Orders are probably not coming in on the average quite as fast as tools are going out, but every shop is so well booked ahead that the slight diminution in total volume of new business is hardly considered of much importance at this time, particularly in cases where orders are still subject to extended delivery dates.

There has been a fair export demand, but this business has been confined largely to the various special tools and general equipment. Manufacturers in some lines of machine tools are considering the matter of looking after foreign trade more aggressively, but will probably not take any definite action as long as there is prospect of a sufficient volume of domestic business to keep them occupied. Export business in the various power transmission specialties continues on a large scale.

The demand for second-hand machine tools continues active. In some cases dealers are complaining about their inability to obtain cars for the shipment of tools, and this, owing to the usual sale of second-hand equipment for immediate delivery, would be rather serious if it became very extensive, which, however, is not probable at this time. The best demand is for tools of the heavier types, on which manufacturers of new tools are not able to make early shipments, although for the medium sized tools the demand is reported to have materially increased.

There is a somewhat better business in engines and boilers, both new and second-hand. The demand usually improves at this season of the year, and some fairly nice orders have been booked. Contracts for several heavy power equipments have been reported, and others are still said to be under consideration. Boilers and engines of the medium horsepowers, both new and second-hand, are in fair demand only, while that for the smaller powers is somewhat inactive.

A good volume of business continues to be taken by the local iron and steel casting plants, in some cases the tonnage on hand being the largest in the history of the respective concerns. Deliveries of steel castings and heavy gray iron machinery castings have improved but little, although in other lines castings may be had more promptly. Many of the foundries would be able to increase their production, but are handicapped to some extent by the inability to obtain molders, while production with others is still retarded by the inability to get prompt deliveries of raw materials, although this latter condition is much better than it was some months ago.

It is understood that negotiations have been completed for the erection of a new plant at State and High streets, East Camden, N. J., for the manufacture of a patent shafting, details regarding which are not yet obtainable.

The Frankford Arsenal, Philadelphia, is asking for bids on a large variety of supplies to be furnished during the year ending June 30, 1908. The specifications include among other things merchant iron and steel, brass and copper tubing, metals, iron castings, steam fitting, electrical and plumbing supplies, leather belting, polishing and grinding materials, &c. Specfications can be had from Col. Frank Heath, at the Frankford Arsenal, and bids will be received until May 15.

It is stated that plans have been adopted by a local syndicate for the reconstruction of an old ocean pier at Atlantic City, N. J. A structural steel pier is proposed, the cost of which is estimated at $600,000. The new pier will be fully equipped for entertainment features, and an observation tower 150 ft. high is to be one of its features.

The Baldwin Locomotive Works has booked an order from the Japanese Government for 20 consolidation and 2 passenger locomotives, for a Manchurian railroad. Delivery on these engines is to be made early in July. The works continue busy in all departments, and while no large orders have recently been booked, there is enough on hand to keep them occupied well toward the close of the year.

The American Pulley Company reports a good volume of business, both from foreign and domestic sources. There was a slight falling off in the demand early in the month, but this has been more than made up by increased orders during the last half of the month. Some extensive shipments of pulleys have been made to Australia, New Zealand, London, England, and Continental Europe. The domestic demand has been good, and shipments in carload lots have been made to Portland, Ore., and San Francisco, Cal.

The Energy Elevator Company is busy, and business is

reported fully up to the average. There has been a large local as well as out of town demand for elevators of all classes, and every department is being operated at its best capacity. A large house lift has been furnished for shipment to Canada, while carriage and freight elevators are being shipped to customers in both the East and Middle West. A 1-ton electric and a large steam freight elevator are also being installed for local concerns.

The Standard Pressed Steel Company notes a largely increased foreign demand for its pressed steel shaft hangers, and large orders in some cases for 500 to 600 hangers each have been shipped to Australia, Mexico, Honolulu, France and other countries in Europe. Several hundred hangers have also been furnished parties in Chattanooga, Tenn., for the equipment of a manufacturing plant in that vicinity. The plant of the company continues fully occupied, and the outlook for future business is considered most excellent.

The Link-Belt Engineering Company continues to book a large volume of business. Inquiries continue in very good number, and cover a wide range of transmission machinery. This company has recently shipped a quantity of elevating and conveying machinery to Australia, and sugar handling machinery to Cuba. Orders for cement handling machinery and coal and ash handling plants for industrial concerns have been booked, as have also orders for a large retarding coal conveyor of 150 tons per hour capacity for the U. S. Coal & Coke Company, Gary, W. Va.; a barrel and sack handling equipment for the Lehigh Valley Railroad, at Jersey City, N. J., and a large coal and ash conveying and handling equipment for the city of Philadelphia, to be installed at the Torresdale Filtration plant. The company is operating its plant on full double turn, and has sufficient business on hand to keep it fully occupied for many months.

Government Purchases.

WASHINGTON, D. C., April 23, 1907.

The Isthmian Canal Commission will soon ask bids for four 25-ton locomotive cranes, with 30-ft. span.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until May 14 for the following machine tools for the Eastern navy yards: Schedule 674, portable hoisting engine; schedule 675, engine lathe, drilling machine; schedule 676, jib foundry crane; schedule 677, hydraulic accumulator, hydraulic rivetter, hydraulic flanging machines, milling machine, high speed drill, water tube boiler, pattern makers' lathe, band saw, buzz planer; schedule 678, metal sawing machine.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until May 7 for road building machinery, hydraulic jacks, &c., for the Southern navy yards.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until May 14 for pneumatic drills, pneumatic hammers, valve reseating machines and other supplies for the Eastern navy yards.

The Isthmian Canal Commission will receive bids until May 7, Circular No. 362, for locomotive cranes and other supplies.

The following bids were opened April 13, for two 750-kw. turbo generators for the Boston Navy Yard.

The General Electric Company, Schenectady, N. Y., item 1, $34,400, seven months, $1600 deduct conditionally, old material not to be taken.

The Westinghouse Machine Company, New York, item 1, $53,847, six months; 2, $3338 allowance for old material.

The following bids for supplies for the navy yards were opened April 16:

Bidder 1, the American De Forest Wireless Telegraph Company, New York; 17, Geo. F. Blake Mfg. Company, New York; 41, Chicago Pneumatic Tool Company, New York; 56, D'Olier Engineering Company, Philadelphia, Pa.; 90, General Electric Company, Schenectady, N. Y.; 108, International Telegraph Construction Company, New York; 109, Ingersoll, Rand Company, New York; 131, Montgomery & Co., New York; 144, Massachusetts Wireless Equipment Company, Boston, Mass.; 152, Massie Wireless Telegraph Company, Providence, R. I.; 199, Stone Telegraph & Telephone Company, Boston, Mass.; 201, B. F. Sturtevant Company, Hyde Park, Mass.; 204, Telefunken Wireless Company, Philadelphia Pa.; 238, Harron, Rickard & McCone, Philadelphia, Pa.

Class 11. Four outfits of ventilating fans and spare parts—Bidder 90, $3828.10, $4178.10, and $8006.20; 56, $3530.46, $3680 and $7210; 201, $4226.20, $4426.20 and $8652.40; 238, A $3552.90, B $3821.30, C $3552.90.

Class 21. Two duplicate gas engine generating sets and two sets of wireless telegraph apparatus—Bidder 1, $10,500; 108, $23,879.10 and $20,779.10; 144, $23,000; 152, $18,000; 199, $24,756 and $29,124; 204, $31,850, $29,800, $33,850, $29,000 and $27,000.

Class 163. Two pneumatic grinders or buffers, with spare parts—Bidder 41, $421.80; 109, $213.75, part.

Class 201. Two pneumatic drills—Bidder 41, $130.

Class 202. Four pneumatic revolving rivet forges—Bidder 131, $78.

Class 203. Two vertical simplex steam pumps—Bidder 17, $105; 59, $115.

Class 204. Angle shears, punching and bending machines, &c.—Bidder 131, $298.75.

The following awards have been made for supplies for the navy yards, bids for which were opened April 9:

The Lambert Hoisting Engine Company, Newark, N. J., class 41, two hoisting engines, $1498.50.

The Frevert Machinery Company, New York, class 61, two valve reseating machines, $441.

The Chicago Pneumatic Tool Company, New York, class 63, one portable pneumatic countersinking machine, $215.

The following awards have been made for supplies for the Isthmian Canal Commission, Circular No. 355, bids for which were opened March 26:

Manning, Maxwell & Moore, New York, class 1, one pipe cutting and threading machine, $1079; class 5, one floor grinder, $56.50; class 7, one universal radial drill, $1256.95; class 13, one rotary splitting shear, $917.34; class 14, four duplex lever punches, $156.41; class 15, one double punch and shear and a quantity of punches, dies, &c., $2457.15.

The Landis Machine Company, Waynesboro, Pa., class 2, one double headed bolt cutter, $745.

Fox Bros. & Co., New York, class 4, one universal cutter and tool grinder, $289.74.

The Prentiss Tool & Supply Company, New York, class 6, two sliding head drill presses, $414.

The Pratt & Whitney Company, Hartford, Conn., class 11, one tool room engine lathe, $890.

Under bids opened March 26 for supplies for the navy yards, the following awards have been made:

The Wilmarth & Morman Company, Grand Rapids, Mich., class 128, one twist drill grinder, $90.75.

Manning, Maxwell & Moore, New York, class 131, one pipe cutting and threading machine, $260.

The Niles-Bement-Pond Company, New York, class 132, one hand shear, $148.

Under bids opened March 18, Circular No. 354, for supplies for the Isthmian Canal Commission, the Vandyck-Churchill Company, New York, has been awarded class 7, two automatic saw grinders and six carborundum wheels, $402; Ingersoll-Rand Company, New York, class 8, two pneumatic gear hoists, $450.

The Niles-Bement-Pond Company, New York, has been awarded contract for one radial drill at $1075 for Tompkinsville, N. Y., bids for which were opened March 16.

Catalogues Wanted.—The catalogue files of Roy & Titcomb, exporters and jobbers of machinery, hardware, &c., Nogales, Ariz., having become obsolete, the firm desires a full line of catalogues of all classes of machinery and iron products.

Extruded Metal.—This is a form of structural material in brass and bronze which is coming into extensive use in this country for architectural finish, structural and industrial purposes. The process of manufacture involves forcing the metal, heated to the temperature of plastic consistency, through accurately shaped dies by heavy hydraulic pressure, in a manner similar to that employed in forming lead pipe. The brass or bronze is heated in billets, which are placed in a forcing cylinder or container, with the die at the front end and the forcing plate at the rear, the plastic metal being forced through the die and issuing from it in a long bar of cross section corresponding to the shape of the opening in the die. Very high pressures are used, frequently reaching as much as 60,000 lb. per square inch, which results in greatly increasing the density of the metal and rendering it perfectly homogeneous and free from the defects common with castings. The bars also have greater strength and tenacity than those made by the usual process of rolling or by other methods of working.

From 1896 to 1905 the length of British railroads increased from a total of 21,277 miles to 22,847 miles, or 7 per cent. The increase in single track mileage was from 9688 to 10,154 miles, or 5 per cent; and of the double and multiple track mileage from 11,589 to 12,693 miles, or 9.5 per cent. Double track formed 54.4 per cent. of the total in 1896 and 55.5 per cent. in 1905.

Channeling of valves in hydraulic systems is sometimes caused by scale carried from the iron pipes by the water, this being almost as bad an abrasive as sand. Resistance of the metal to wear, it is stated, will be improved by an increase of lead in the mixture.

Pennsylvania Business Legislation.

HARRISBURG, PA., April 24, 1907.—It is probable that by the end of this week the Senate committees will have acted upon the various bills for the increase of taxation on corporations, which passed the House last week. It is expected that most of them will be reported affirmatively.

The Senate committee also has the Employers' Liability bill, which passed the House last week, but may not report it for a week. This measure is one of the most drastic of the kind presented to the Legislature, in that it makes employers responsible for almost every accident, except where absolute negligence of the injured party can be proved. There is considerable objection raised to it, especially from railroads and coal companies.

The Senate has passed and sent to the House a bill providing that all bridges known as county bridges or to be hereafter erected over and across navigable streams are to be known as State bridges, and as such to be maintained and repaired by the State Highway Department. This bill carries with it an initial appropriation of $500,000, and provides that a similar sum shall be appropriated annually to carry out the provisions of this act. The bill will probably pass the House. It will enable the State to build a number of bridges which cannot now be erected because of opposition or lack of funds in counties. Another important bridge bill, which will be laid before the Governor for his action in a few days, gives county commissioners charge of all township bridges over 35 ft. in length, providing for rebuilding any which may be destroyed, and for the building of new ones by county commissioners.

There are pending in the Legislature a number of bills for the building of new State hospitals, the aggregate for such construction being estimated at over $1,500,000. Should these bills pass, as seems very probable at this time, the work will be undertaken with very little delay, owing to the necessity for additional room. Most of the buildings will be of steel.

Several important railroad bills are pending, among them being one for the creation of a State Commerce Commission, to have authority over rates. Two bills of this character are up to the Senate, and a composite bill will probably be drafted. It seems likely that such a bill will be enacted into a law. Other railroad bills of importance, to regulate switching, car distribution and demurrage, are in committees. The House of Representatives negatived one demurrage bill after protests by railroads, coal operators and shippers. There will also be opposition to the bill to provide for track weigh scales, which is in committee.

Governor Stuart has signed the bill to permit trolley companies to carry freight, and a rapid extension of electric lines is expected all over the State. This bill has a companion bill, which permits trolley companies when equipped to carry freight to have the right of eminent domain, but it is still in the hands of a Senate committee after having passed the lower chamber. Another pending bill is to permit trolley companies and electric companies to supply power to auto truck and motor operating parcel delivery concerns.

Heavy penalties and restrictions have been planned for owners of traction engines because of alleged dangers to bridges and harm to roads, and hearings have been accorded to representatives of the manufacturers, with the result that a measure fair to all will be reported out of committee.

A. B. H.

A committee of officials and engineers is now at Duluth to select the site and decide upon many of the details in connection with the new steel plant. W. B. Dickson, second vice-president of the United States Steel Corporation, is chairman of the committee, and there are associated with him John Reis, assistant to the president; T. W. Robinson of the Illinois Steel Company, Fred H. Daniels of the American Steel & Wire Company, E. E. Slick of the Carnegie Steel Company and Geo. G. Crawford of the National Tube Company.

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HARDWARE

THE question as to the course to be pursued by manufacturers and merchants when the cost of the goods made or handled by them advances is not as simple as it might seem at first flush. It is not feasible in trade to maintain prices which carry with them a uniform profit. While increased cost would seem on general principles to call for higher selling prices there are often other considerations which enter into the problem and make contentment with narrower margins for a time at least the part of wisdom. While as a general rule it is well to fall in with the upward movement of a rising market and to make the most of the opportunities which then present themselves, there are circumstances and conditions under which, taking a broad view of the question, it is better to be satisfied with diminished profits rather than make advances in the selling prices. The temptation to announce the higher prices which greater costs would in the abstract justify is so obvious and insistent that both manufacturers and merchants are ordinarily prompt to yield to it.

The trade, however, affords illustrations of manufacturers in the Hardware field who for years have been conspicuous in resisting the tendency to change their prices even with an extraordinary pressure of business and materially increased cost of manufacture. It is well known that in foreign trade changes in quotations are exceedingly injurious and act as a hindrance to business. The same principle to a less extent unquestionably holds in the home market. High prices, by the loss of trade and automatically, may be said to operate as a break upon business, tending to diminish its free and full movement. A manufacturer who desires a prominent place in the market recognizes the part played in securing it by the keeping of his goods at a low rather than a high level of prices. The names of great manufacturers will occur to our readers who have year after year pursued this policy, and in spite of continued and persistent competition have been able to hold their position and even extend their influence, where the pursuing of a different course would have been making smooth the pathway of their rivals.

The recent course of the market affords illustrations of the manner in which this important and difficult question has been settled by multitudes of manufacturers. The advances in materials and labor and of the manifold costs of making and marketing goods have in many lines, indeed in most lines, compelled higher prices for the finished product. In announcing these advances the factories have not infrequently broadened their margins of profit, making more ample advances than were really necessary, the result being a materially increased selling price. There are, however, not a few illustrations of the pursuing of a more conservative policy. Many manufacturers, indeed, at the present time are selling their goods at closer margins than they did a year or two ago. Advances may have been necessary, but the advances have been made conservatively and reluctantly —probably in the assurance that the retrograde movement, the inevitable decline, is only a question of time. A few manufacturers to whom it would have been an easy and in fact a natural thing to announce higher prices have kept their products on the old level even in the presence of an increasing cost in making them. There is on the part of those who act conservatively in this matter and refrain from advancing their goods the sacrifice of an immediate profit, but the strengthening of their position in the market and the safeguarding of their interests.

Condition of Trade.

The volume of business continues large and with an excellent feeling in the trade. It is noticeable that according to the reports from many sections, and especially from the West, the jobbers are very busy, and April is making a fine record. Quite naturally comparisons are freely made with the conditions and business of a year ago, and it is interesting to note that the month seems to be holding its own in a very satisfactory manner. Some manufacturers and jobers, indeed, report it as even better than the same month of last year. Some of the leading jobbing houses also refer to the fact that business for April is surprisingly good, when the exceptionally heavy volume of business for March is taken into account. Owing to local influences there may be in some parts of the country indications of a falling off in the demand, but taken all in all the merchants are called upon to take care of at least a normal and certainly a steady demand, with very favorable conditions resulting from the prosperity of the people and their continued enterprise. The tone of the market in prices is still steady and strong. Few changes are being announced, but most of these are of moderate advances. While the prices of many goods have been moved up, some of them quite liberally, there are a few lines in which the conservatism of the manufacturers has kept them from making changes, realizing that one menace to the trade is the cutting off of business because of the high prices now current for almost every commodity. The fact that the larger merchants and those who take a far-sighted view of the situation are somewhat more conservative than heretofore in placing orders may tend to check an upward tendency, which carried much further would certainly prepare the way for a reaction. The reports in regard to the crops will continue to be watched with interest and solicitude, with the usual discounting of predictions of serious injury to them. The existing prosperity and the prospects of its continuance, even at a somewhat lessened pace, induces a spirit of confidence, which justifies both manufacturers and merchants in an enterprising and energetic conduct of their business.

Chicago.

Notwithstanding the depressing tenor of crop news resulting from the reported effects of cold weather, droughts and ravages of insects in different sections of the country, trade in Hardware is seemingly unaffected. It is now asserted that unless a sharp curtailment in volume ensues within the next week or 10 days the business for April will rival that of March, which outstripped all former records. Advices received from commercial travelers agree that the crop damage has in most instances been overstated and that agricultural communities are not seriously disturbed over the outlook. At any rate, whatever concern may be felt is not reflected in diminished trade from the territory affected. It was confidently expected that the pressure of demand for Wire Nails and Wire products would before this time have been lessened, but as yet it is undiminished. As compared

with the corresponding period of last year the American Steel & Wire Company now have booked an aggregate tonnage nearly three times as great as that shown a year ago, while warehouse stocks are now only 40 per cent. as large as then. Farm and Garden Tools are scarce and jobbers are in receipt of much peppery correspondence from customers whose patience is exhausted with delay. The demand for Carpenters' Tools is also notably large and stocks are being depleted faster than they can be supplied. The rebuilding of San Francisco has given rise to an extremely heavy Pacific Coast trade in Hardware of all kinds, most of which is supplied by manufacturers of the East and Middle West. As an instance of the extensive shipments being made to that point, it is stated that five carloads of Hinges were recently forwarded in one consignment. The demand from other Coast towns is also unusually large. No price changes of consequence are noted, but prices in effect are well maintained.

NOTES ON PRICES.

Wire Nails.—Urgent demands for prompt shipments from mill are coming from all sections of the country. Leading mills are four to six weeks behind shipments and some mills are not promising deliveries under three months. The supply of cars and Steel is inadequate, while stocks at the mills and in jobbers' hands are light. The market continues very firm. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers	$2.00
Carload lots, to retail merchants	2.05

New York.—The local demand continues moderate, but up to date is in excess of the same period in March. Jobbers' stocks are more or less broken in assortment, owing to delayed shipments from mills. Stocks are often so broken as to make sizes most called for unobtainable in the city. New York quotations are: To retailers, carloads, on dock, $2.19; less than carloads, on dock, $2.33; small lots at store, $2.30.

Chicago.—Apparently the calamity crop reports and frost and drought damage stories that have been in circulation for some time past have had no halting effect upon demand. From the way customers are crowding the mills for deliveries, the goods ordered are wanted to supply waiting consumers. Quotations are as follows: $2.15 in car lots to jobbers and $2.20 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—Deliveries on Wire Nails by the mills seem to be getting worse, due to continued shortage in supply of Steel and also in cars. None of the leading Wire Nail mills can make deliveries inside of four to six weeks and some mills cannot promise shipments inside of three months. Stocks held by jobbers and at the mills are very light and some Wire Nail concerns are actually being threatened with legal proceedings over delayed deliveries. It looks very much as though there will not be enough Wire Nails to meet the demand, unless the supply of Steel and cars should improve. Prices are very firm but unchanged. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers	$2.00
Carload lots, to retail merchants	2.05

Cut Nails.—The regular meeting of the Cut Nail Association will be held on April 30, in Philadelphia. It is anticipated that existing prices will be reaffirmed. While new business at the mills is largely confined to small lots, specifications on contract orders are being received freely, so that mills are not making much headway in catching up with deliveries. The scarcity of Steel prevents mills making a full output, while shortage of cars keeps shipments back. Quotations are as follows, f.o.b. Pittsburgh: Carload lots, to jobbers, $2.05; less than carloads, to jobbers, $2.10; less than carloads, to retailers, $2.20. Iron Cut Nails at points west of Buffalo and Pittsburgh are held at 10 cents advance on Steel Cut Nails.

New York.—The demand is not as large as for Wire Nails, and the assortment of stocks is still poor and some trouble is experienced in supplying customers' requirements promptly. Jobbers' quotations are on the basis of $2.30 for small lots at store.

Chicago.—There is no noticeable change either in demand, which is still good, or in conditions of mill deliveries or shipments. Certain sizes are at times extremely scarce. Quotations are as follows: Iron Cut Nails, car lots, to jobbers, $2.30; to retailers, $2.35; Steel, to jobbers, in car lots, $2.20; to retailers, $2.25.

Pittsburgh.—The demand for Cut Nails is mostly for small lots, but specifications on contracts are coming in freely and the mills are still very much behind in deliveries. The continued shortage in supply of Steel, and also in cars, prevents the mills from making full output and retards shipments. Prices are firm, but without change. Quotations are as follows, f.o.b. Pittsburgh: Carload lots, to jobbers, $2.05; less than carloads, to jobbers, $2.10; less than carloads, to retailers, $2.20. Iron Cut Nails at points west of Buffalo and Pittsburgh are held at 10 cents advance on Steel Cut Nails.

Barb Wire.—The lack of supply of Steel and cars is delaying shipments from mill, while stocks are reported light all over the country. The demand is continuing active later than usual this season. The market is firm, and quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots	$2.15	$2.45
Retailers, carload lots	2.20	2.50
Retailers, less than carload lots	2.30	2.60

Chicago.—That the demand should continue with unabated force so late in the season is a matter of surprise to both mills and jobbers. Both would welcome a chance to catch up a little, but it is not yet offered. Trade is on all hands reported good. We quote as follows: Jobbers, Chicago, car lots, Painted, $2.30; Galvanized, $2.60; to retailers, car lots, Painted, $2.35; Galvanized, $2.65; retailers, less than car lots, Painted, $2.45; Galvanized, $2.75; Staples, Bright, in car lots, $2.25; Galvanized, $2.55; car lots, to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—The market is in about the same condition as Wire Nails. The mills are behind in shipments, due to shortage in supply of Steel and in cars, and stocks all over the country are reported as very light. The demand from all sections is active, and specifications against contracts are very heavy. The market is firm but unchanged. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots	$2.15	$2.45
Retailers, carload lots	2.20	2.50
Retailers, less than carload lots	2.30	2.60

Smooth Fence Wire.—The Steel and car conditions which are prominent in other Wire products are affecting the output and shipment of Smooth Fence Wire. The demand continues heavy. The market is firm, and quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.85
Retailers, carloads	1.90

The foregoing prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12&12½	13	14	15	16
Annealed	Base.	$0.05	.10	.15	.25	.35	.45	.55
Galvanized	$0.30	.35	.40	.45	.55	.65	1.05	1.15

Chicago.—The demand for all sizes of Smooth Wire continues insistent, and because of slow shipments factories are sometimes short of stock for their full requirements. Quotations are as follows: In car lots, to jobbers, $2, f.o.b. Chicago, and to retailers, $2.05.

Pittsburgh.—Demand continues exceedingly active, heavy orders being received from Fence manufacturers and other consumers of Wire, and while the mills are doing their utmost to meet the heavy demand they are still very much behind in deliveries, with not very good prospects of catching up. This is due to the shortage in sup-

ply of Steel and in cars, which greatly retard both output and shipments. The market is very firm, but there is no intimation of an early advance in prices. We quote f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.85
Retailers, carloads	1.90

The foregoing prices are for base numbers, 6 to 9.

Sash Weights.—The Sash Weight market, notwithstanding the different conditions which prevail in various parts of the country is, as a whole, strong, and within the past 60 days there have been further advances in price. The continued high price of scrap iron has had an influence in this direction. This is especialiy the case in the Central and Western districts in which advances have taken place ranging from $3 to $5 per ton, the more radical advances representing a reaction from low prices which were developed by animated competition between the manufacturers. The difficulty of obtaining raw material and its high price has tended to correct this condition, and the result is more uniformity in quotations. Throughout the Western and Central districts, the market may be represented in a general way by the range of $25 to $28.50 per ton, some foundries, indeed, naming a slightly higher figure. In the Southern districts there has been an advance of about $1, and the market in a general way is represented by the quotation of $24 to $25 per ton. In the East prices have continued steady, and no further advance is to be noted. There is, however, a possibility that if the price of Scrap Iron is maintained, it may be necessary to announce somewhat higher prices.

Axes.—The market for Axes retains the tendency to firmness which has been observed since the opening of the season, and manufacturers, many of whom withheld a portion of their output for better prices, are apparently able to realize their expectations on late orders.

Copper Products.—The market on Copper Products is said to be practically at a standstill, buyers hesitating to purchase at present prices on account of evidence of weakness in quotations on Copper metal. Sellers, however, do not show a disposition to make concessions in prices.

Tin and Galvanized Ware.—As reported in our last issue a semisocial gathering was held in this city last week, made up of manufacturers of all lines of Sheet Metalware. In a general way it may be stated that their conferences, although mainly informal in character, will probably have a beneficial effect in a business way. Many manufacturers have recently announced advances of about 5 per cent. in Pieced Tinware, Japanned Ware and the general line of Galvanized Ware, not including, however, Tubs, Coal Hods and Water Pails. An advance of $2 per gross in list prices has also been made on Light Galvanized Tubs, with and without Wringer attachment. This applies only to one size of Tubs which are approximately 23 in. in diameter. Manufacturers who were in the city agree in a report that while the large trade is not speculating in staple goods, as was the case last year, business is in a healthy condition, with an excellent demand for general lines.

Enameled Ware.—The new standard price-lists of Enameled Ware recently issued by the various manufacturers are now pretty widely distributed among the trade, and afford a generally accepted basis for prices in transactions with the manufacturers. The market on One and Two Coat Ware may be represented by a discount of 60 per cent. from this list, with the usual concessions to jobbers and other large buyers. On Two and Three Coat to Four and Five Coat, discounts range from 50 and 10 to 40 per cent. Jobbers generally are still using former list prices or selling at net figures.

Hammers.—Manufacturers of leading brands of Handled Hammers are still receiving orders considerably above their capacity, and are said to be many weeks behind in their deliveries.

Shovels.—Although Shovels are selling at higher prices than have ruled for a long time, it is stated that business is in large volume, and manufacturers, especially of standard brands, are all considerably behind in their deliveries. Difficulty in getting steel and handles of proper grades is said to be the cause of no little inconvenience and delay.

Stove Bolts.—An excellent demand is reported by all handlers of Stove Bolts, and prices are said to be holding exceptionally firm, the market to average buyers being represented by a discount of about 85 per cent.

Binder Twine.—The market shows lack of strength, owing to reports of damaged crops and the possibility of a considerable area of small grain being plowed up. Under these conditions merchants are buying freely of Twine. Indications are that some concerns are holding to schedule prices, while others are shading them in various ways. The following quotations fairly represent the market:

	Per lb.
Sisal	9½ to 9⅝
Standard	9½ to 9⅝
Standard Manila	10¾
Manila (600 ft.)	12¼
Pure Manila	13¾ to 14

Carloads ¼ cent less; five ton lots ⅛ cent less, central delivery.

Rope.—A fair amount of business is being transacted and prices are generally maintained. The demand has not reached active proportions, but manufacturers are looking forward to better business with the advance of the season. The following quotations are sometimes shaded ¼ to ½ cent per pound: Pure Manila, 13 to 13½ cents; B quality, 12 to 12½ cents; Pure Sisal, 9¼ cents; No. 2 quality, 7¾ to 8 cents; No. 1 Jute, ¼ in. and up, 9 cents; No. 2 Jute, 8½ cents.

Window Glass.—April 20 ended the blast of all the Window Glass factories identified with the National Brokerage Company, representing about 2000 pot capacity. It is reported that the American Glass Company, which operates the machine blown Glass factories, has intimated it will cut prices again if the independent hand operated factories do not also close down. This report lacks official confirmation. The hand operated factories, which are still in operation, representing about a 400 pot capacity, will not produce enough Glass to affect the market to any extent, as the factories will be closing down, one by one, until hot weather prevents working longer. The lack of active demand in this market has caused the shading of quotations in some cases. Jobbers' quotations from jobbers' list October 1, 1903, are as follows: Greater New York, 90 and 10 per cent. discount on all sizes, single and double strength; outside of Greater New York, 90 and 5 per cent. for single, and 90 and 10 per cent. discount for double strength Glass.

Linseed Oil.—The market remains dull and uninteresting because of the absence of large buyers, who are waiting for lower prices. Three Linseed Oil factories are reported as having been closed down because of lack of further storing capacity for Oil. Because of the average high prices paid for Seed it is said that Oil sold at present quotations represents a loss. It is thought by some in the trade that concessions in price will have to be made by manufacturers before the demand increases to any extent. New York quotations for jobbing lots are as follows, according to quality: City Raw, 42 to 43 cents per gallon; Out of Town Raw, 40 to 41 cents per gallon. Boiled Oil is 1 cent a gallon over Raw.

Spirits Turpentine.—The demand in the South is reported good and the market firm. Local selling is confined to jobbing lots, as buyers are anticipating lower prices with the opening of May. New York quotations are as follows, according to quantity: Oil Barrels, 69½ to 70 cents; Machine Made Barrels, 70 to 70½ cents per gallon.

A NOTEWORTHY FEATURE of the gathering of the American Hardware Manufacturers' Association and Southern Hardware Jobbers' Association at Richmond, Va., June 11-14, will be an address by W. W. Finley, president of the Southern Railway. Mr. Finley's subject will be "The Railroad Question as Viewed by a Railroad President," and his discussion of this important and timely topic should prove interesting and instructive.

RETAIL HARDWARE TRADE NOTES.

Lorena Lumber & Hardware Company, successor to Holvey & Westbrook, in Lorena, Texas., has been incorporated with a capital stock of $20,000. The company will handle Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints and Oils. A new brick building, 35 x 75 ft., in size is occupied by the company.

Arthur E. Horlock has succeeded to the business of A. E. Horlock Company, in Hanford, Cal. The stock includes Shelf and Heavy Hardware, Stoves, Tinware, Paints, Sporting Goods, Plumbing Goods and Sheet Metals.

The Russell-Porter Hardware Company, West Allis, Wis., has been incorporated, and besides handling a general line of Hardware, will do Plumbing, Electrical Work, Hot Air and Hot Water Heating and Iron and Tin Jobbing Repair Work. The officers are J. B. Russell, president; G. M. Russell, vice-president; J. Porter, Jr., secretary and treasurer.

E. C. Brekken has purchased the Hardware store of Scott & Barret, Pekin, N. D. Mr. Brekken will remodel the store and stock it with a complete line of General Hardware.

The Alliance Hardware Company, Alliance, Ohio, has about completed a six-story building. The company will do both a wholesale and retail business, occupying five floors and the basement. The latter will be used for the heating and plumbing department.

The Hardware and Furniture store of McGaughey & Brinks, Hartford, Ark., was recently destroyed by fire, although a considerable portion of the stock was saved. The loss is covered by insurance.

E. M. Sanborn of Sanborn & Robinson, Lawrence, Mass., has sold his interest to J. L. Toohey. The business will be continued under the style of the Robinson Hardware Company.

The Stockport Hardware Company, Stockport, Ohio, has been incorporated with a capital of $10,000. The business will be a diversified one covering Shelf and Heavy Hardware, Stoves and Tinware, Agricultural Implements and Machinery, Paints and Oils, Sewer Pipe and Drain Tile, Brick, Lime, Cement, Slate, &c.

W. T. Berentz has taken over the Hardware and Implement business of Berentz & Muzzy at Bartlesville, Ind. Ter.

John S. Brown and Joseph N. Seaney, formerly connected with the Jones Hardware Company, Richmond, Ind., have under the firm name of Seaney & Brown opened a Hardware store at that place, and will handle a general line of Hardware, Paints, Stoves and Ranges.

W. H. Tiffany has purchased the Hardware and Implement business of A. N. Tiffany & Co., at Antioch, Ill., and will continue at the old stand.

The White-Buck Hardware Company, Racine, Wis., Stoves, Hardware and House Furnishing Goods, has changed its name to the White Hardware Company. Geo. L. Buck's interest in the firm has been purchased by G. W. White and W. C. Palmer.

J. B. Varnum, who has been in the retail Hardware, Stove, Tinware and Sporting Goods business at Rocheport, Mo., for the past 15 years, has moved his business to Boonville, Mo.

Stroud-Gary Hardware Company has been incorporated at Hereford, Texas, by W. A. Gary, R. Stringfellow and L. A. Stroud. The capital mentioned is $25,000.

Meridian Hardware & Implement Company has succeeded to the business of G. W. Ritcher in Meridian, Idaho, with E. G. Dunkin as manager. The company will handle Shelf and Heavy Hardware, Stoves, Tinware, Agricultural Implements, Paints, Oils and Sporting Goods.

Varney & Macy has succeeded to the business of Jacob Ohm, in Rising City, Neb. The stock includes Shelf and Heavy Hardware, Stoves, Tinware, Sporting and Athletic Goods.

Thomas Gass, Elmcreek, Neb., has sold the furniture part of his business to Clark Bros. & Ray, and will continue in the Hardware business exclusively.

J. T. Ireland & Co. have purchased the business of H. Edwards in King City, Mo. They will carry Shelf and Heavy Hardware, Stoves, Tinware and furniture.

Blanchard & Beem have succeeded Busselle & Blanchard, Chariton, Iowa, in the Shelf and Heavy Hardware, Stove, Tinware, Agricultural Implement and Sporting Goods business.

The Gluck-Spatholt Hardware Company, Youngstown, Ohio, will hereafter be known under the style of the Gluck Hardware Company. Another partner, Albert Gluck, has become identified with the business.

For the purpose of increasing the scope of its business and extending its line, the Starr Hardware Company, Jackson, Mich., has increased its capital stock from $15,000 to $25,000.

Joseph W. Timmer, Kansas City, Mo., has opened a branch store at 507 Minnesota avenue, where a complete stock of Hardware and Building Materials will be carried.

H. W. Eagan, formerly engaged with the Townley Metal & Hardware Company, Kansas City, Mo., has formed a partnership with S. S. Miller in the Hardware business at La Place, Ill.

Brewer & Brown, successors to Charles Crook, Meadow Grove, Neb., will continue the business as heretofore conducted, carrying Shelf and Heavy Hardware, Stoves, Cream Separators and Sewing Machines.

The Fulton Hardware Company, Portland, Ind., has been reorganized and will incorporate with a capital stock of $60,000 paid in. The officers and directors of the new company are James L. Fulton, president and manager; John Bell, secretary and treasurer; William Current, Sherman Snyder, Frank G. Hodges and Emmett Luzzader. Among the stockholders are Fred Bimel, Arthur Krick, Osro Beebe, C. L. Cook and a number of well-known citizens of Portland and Jay County. The large business done by this concern has been built up through the energy and ability of James L. Fulton, who, together with his brother, B. F. Fulton, founded it in March 1882. Since 1885, Mr. Fulton has been the sole manager, and has found the steadily growing business too great a strain upon his strength, especially as he is also identified with several other enterprises. Desiring the continued growth and perpetuation of the business established by him, Mr. Fulton has associated with him the young men named above, most of whom have been employees of the store for some time. Mr. Fulton is the largest stockholder and will continue in direction of the affairs of the company.

Reek Brothers, Fountain, Mich., have opened a Hardware store at that place and will carry a stock of Hardware, Farm Implements, Building Material and Lumber.

The Hardware store of Joseph Netzer, Laredo, Texas, was recently damaged to the extent of several thousand dollars by fire.

The People's Hardware & Furniture Company has succeeded the Winnfield Hardware & Furniture Company in Winnfield, La.

THE PROSPECTS OF A SALESMAN.

BY FRED BRADFORD ELLSWORTH.

THE great majority of men who have entered the profession and become successful salesmen have invariably started at the bottom. Many have had inside experience in "stock," or originally occupied positions of minor importance. The stockroom, however, is the best place where knowledge can be acquired. Showing that they were bright and energetic and possessed the requisite ability to transact business, they were sent out on the road and soon demonstrated their worth as salesmen. Others had the natural aptitude for the work. They possessed a good personality, were fluent talkers, and besides being keen students of human nature had that ability to gain confidence which is the predominant factor in successful salesmanship and from which success springs. Salesmen of this class, like geniuses, are sometimes

Born, Not Made.

When a salesman has been in the employ of a firm for a short time he has simply had the opportunity of getting acquainted with the trade in the territory he has to cover. He familiarizes himself pretty thoroughly with the individuals he has to deal with. Their idiosyncrasies, whims and caprices become an open book to him. Here is where the fine points of scientific salesmanship come in—

A Knowledge of Human Nature,

and in comparison to what he may know of it, an experienced man will tell you frankly that every day he has something new to add to the fund he has already acquired. After a number of years' experience of faithful, conscientious, hard work his position is generally assured and he is an indispensable salesman to the firm he represents.

There is Uncertainty & Co. of New York, who always believe that prices will decline still further every time the salesman calls. Still he sells them large bills of goods at the opportune time. Bulldozer & Co. of San Francisco whenever he quotes them prices claim they are too high. Yet somehow or other he manages to get their business. Cutthroat & Co. of Chicago buy cheap goods for less money that answer the same purpose and sell them with other lines for less money, without a profit, laboring under the hallucination that they are making money. The salesman secures a profitable amount of business from them. His

Acquaintance with the Trade

alone is worth thousands of dollars to his firm. Such are the relations of a salesman, and an up to date, hustling, progressive firm, not controlled by old fogy ideas and sentiments, realizes his worth to it. It is aware of the fact that the days of transacting business by means of correspondence are past. If you have anything to sell see your prospective customer and talk to him. The salesman knows full well that the time is not so very far distant when he will to a certain extent become

Incapacitated for Work,

and then what prospects has he for the future? I say incapacitated for work, and this may sound strange to many salesmen, and some may take exception to the term. Ten or 15 years of traveling does not tend to rejuvenate men. Is a salesman who has successfully represented a firm and given the best years of his life to that calling not justified in contemplating other compensation than the mere salary he is paid? Is he not entitled to be given

An Interest in the Business

of the firm he represents? Or must he take it for granted that he has been paid for his services, and that is all he can expect or is entitled to? I have discussed this question freely with many of the best business men, and not only with firms who employ salesmen but with the salesmen also. It is conceded to be a vital subject and one not to be lightly considered. Broad minded and liberal firms believe that a salesman is the propelling power of a business and that to a great extent their success is due to his endeavors. Many employers feel that a salesman who has grown up in their business or been associated with them a number of years necessarily creates a relationship other than that which ordinarily exists between employer and employee. They feel that he is

Practically One of Them,

so closely are they allied. Under the existing circumstances many firms give their salesmen an interest in their business. They not only give them an interest, but add to the stock each year, or sell it to them in some instances. Not only that, but they give them a percentage of the net profits besides. Such a course is not only wise and just, but it shows sound business judgment. They better the salesman financially and create a stronger bond between them. They do it for business reasons and likewise because they have his interests at heart and wish him well.

I know of many salesmen who are members of the firm they represent. Many have good sized interests and are really independent. Their employers appreciated them and realized fully the importance they had been in building up their business and making it a success.

Shifting the Load.

They recognized the fact that sooner or later their own usefulness would be at an end, when they would no longer be capable of carrying the responsibility that goes with the management of a business. They felt satisfied to have men who had grown up with them, and in whom they placed implicit confidence, carry the load for them. I once heard the member of a firm say, when his salesmen requested to know if they had any intention of giving him an interest in their business, that his partner would do

An Injustice to His Family

if he gave him an interest in the business. It was the most absurd and irrational statement that a human being could utter. If such a false and dishonest statement carried any weight with it thousands of men who live in affluence and luxury to-day would still be pegging away on a salary. There are many firms that never would have existed. A man guilty of such an assertion and having no more feeling than that for a salesman in my estimation, is wholly mercenary. One of the greatest mistakes many firms make is in not giving their salesmen

Credit for Good Work.

Writing him a nice letter occasionally won't hurt any man. Treat your salesmen right from the very start. Compelling a salesman to ask for a raise in salary when he is justly entitled to it shows poor management and is a humiliation to him. Another poor principle is not to consider his prospects. Compelling a salesman to say that unless his salary is raised or he is given an interest in the business he will have to resign his position does not speak well for a firm which pretends to have any standing in the business world. Granting his requests under such circumstances does not tend to increase the salesman's regard for his firm. A cheap salesman is generally a poor salesman and an expense. A high priced man is an economy in the end. Don't let a few hundred dollars a year, or even a thousand or more, in a salesman's salary be cause for consideration in hiring a good man.

One of the Vital Questions

that arises in connection with giving a salesman an interest in a business is, What influence will it necessarily have on the business itself? There are some men who would squeeze the eagle on the American dollar till the bird screamed, and this class hesitates because it might not control the majority of the stock of the firm. This shows a distrust and lack of confidence in one's partners. When a man is controlled by such sentiments it would be to his own interest and to the best interests of the firm for him to sell out. Whether there are a few or many salesmen employed, it makes not the slightest difference. They can be given stock in a business and the firm can reserve the right to purchase it in case they at any time desire to sever their connections, which is doubtful. They can, if they see fit, reserve the voting

power of it also. Such methods are seldom pursued. Harmony and balancing of interests is one of the most important factors in successfully carrying on a business, and pleasant business relations can only exist where on all sides there is an inclination to meet an issue half way.

PRICE-LISTS, CIRCULARS, Etc.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our Catalogue Department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

THE THOMAS MFG. COMPANY, Springfield, Ohio: Illustrated pamphlet describing the company's Lawn Mowers, and folder devoted to Single Disk Grain Drills.

STEWART IRON WORKS COMPANY, Cincinnati, Ohio: Monthly Bulletin No. 38 devoted to Iron Vases, Settees, Chairs, for parks &c.; Cemetery Lot Inclosures, Hitching Posts, Tree Guards, Public Drinking Fountains, Fences, Gates, &c.

W. D. ALLEN MFG. COMPANY, 151 Lake street, Chicago, Ill., New York office, 70 Warren street: Booklets devoted to Hose Racks and Reels, Siamese Pipe Connections, Lawn Sprinklers, Hose Goose Neck Connections, Hose Holders, Brass Candlesticks, Ash Receivers, &c.

HOFFMAN-CORR MFG. COMPANY, 413-415 Market street, Philadelphia, Pa., New York office, 55-57 White street: Catalogue illustrating and describing Hammocks. These are shown in a variety of colors of different weaves and a variety of styles. Other printed matter relates to price-lists of Lamp Wicks, Cordage, Rope, &c.

BANTAM ANTI-FRICTION COMPANY, Bantam, Conn.: Catalogue relating to Ball and Roller Bearings, Steel Balls, &c.

THE OHIO COOKER COMPANY, Toledo, Ohio: Illustrated catalogue devoted to the O-hi-o Steam Cooker, Combination Steam Cooker and Hot Air Oven, Agate Nickel Steel Seamless Ware, Hot Air and Vapor Bath Cabinets, Wickless Oil Stoves, Metallic Bread and Pastry Boards, Wire Kettle Bottom, Dust Beaters, Kitchen Specialties, &c.

PARRY MFG. COMPANY, Indianapolis, Ind.: 1907 catalogue of Carriages, Surries, Phaetons, Phaetonettes, Buggies, Stanhopes, Driving and Delivery Wagons, Carts, &c.

WILLIAM HJORTH & Co., Jamestown, N. Y.: Printed matter illustrating Combination Pliers, Empire Pipe Wrenches, Lightning Combination Wrench and Plier.

PATTERSON, GOTTFRIED & HUNTER, 146-150 Centre street, New York: Handy catalogue of over 260 pages referring to an extensive line of Blacksmiths' Tools and supplies for machinists and repair men. Other special catalogues recently issued by this firm include No. 60, referring to Screws, Bolts, &c.; No. 70, Shop Furniture; No. 115, Power Transmission Appliances; No. 120, Lathes, Punches and Shears, and No. 122, Drilling Machinery.

EAGLE CARRIAGE COMPANY, Cincinnati, Ohio: Illustrated catalogue and price-list No. 18, referring to an extensive line of Pony Vehicles and Harness.

STOVER MFG. COMPANY, Freeport, Ill.: Two pamphlets, one relating to the New Idea Floor Hinge Spring and the other dealing with Stove Trimmings and Specialties.

BULLARD & GORMLEY COMPANY, Chicago, Ill.: An attractive Sporting Goods catalogue of 100 pages illustrating a complete line of fishing and hunting outfits. Several colored plates are introduced to show new designs in patent Baits and Spoon Hooks, in which is included the firm's own "special made" pearl Trolling Spoons.

ENTERPRISE ENAMEL COMPANY, Bellaire, Ohio: Attractive booklets, illustrated in colors, referring respectively to Azurelite and Limonite Enameled Wares, Nublu Enameled Ware and Chrysolite Enameled Ware.

GIFFORD-WOOD COMPANY, Hudson, N. Y.: Illustrated catalogue for the summer of 1907, referring to an extensive line of Ice Tools and Ice Handling Machines.

A. F. MEISSELBACH & BROTHER, Newark, N. J.: Illustrated catalogue and booklet referring to Takapart and other brands of Fishing Reels, Landing Net Rings, Rod Holders, Gaff Hooks, One Drop Never Leak Oil Cans, &c.

BRYAN MFG. COMPANY, Bryan, Ohio: Illustrated catalogue No. 40, referring to Champion Malleable Shod Wheelbarrows for all purposes.

TEMPLE PUMP COMPANY, Chicago, Ill.: Illustrated catalogue of Gasoline Engines, Windmills, Pumps, Tanks, &c.

POPE MFG. COMPANY, Hartford, Conn.: Budget of attractive catalogues for 1907, referring respectively to Pope-Waverly Electric Vehicles and Pope-Toledo, Pope-Tribune and Pope-Hartford Automobiles.

PRESIDENT CORBIN PLEDGES BANK'S INTEREST.

PHILIP CORBIN, president of the American Hardware Corporation, New Britain, Conn., has agreed to guarantee the payment of the usual dividends to depositors of the New Britain Savings Bank, of which he is president, for a period of two years, beginning with the dividend payable July 1. This is the bank whose treasurer, William F. Walker, absconded several months since, taking with him a large part of the funds and putting the bank in a rather precarious condition for a time.

The offer of President Corbin was entirely voluntary, and is a remarkably generous one. It relieves the depositors of whatever lingering misgiving any of them may have had as to the ability of the bank to pay the dividends. Mr. Corbin is in no way legally or morally responsible for the result of Treasurer Walker's embezzlement, but with his high sense of business honor he felt impelled to assume the responsibility of restoring the bank to the confidence of the depositors, even if that assumption involved him in a liability amounting to over $500,000. This magnificent exhibition of public spirit on the part of Mr. Corbin will be gratefully remembered by the people of New Britain. The depositors, who have been anxious about the condition of the bank, will breathe easier now that the payment of their dividends for two years is assured.

President Corbin's Agreement.

The communication of Mr. Corbin, in which his extraordinary offer was made, was read at a meeting of the directors of the bank, held on the 17th inst. Following is the agreement which was signed by Mr. Corbin on April 11, and witnessed by two directors of the bank, William H. Hart and Col. Charles M. Jarvis:

I think the public in general is convinced that the Savings Bank of New Britain is perfectly solvent and will pay its depositors a dollar for every dollar of their deposits, but I have heard that there is some uneasiness with reference to its immediate dividend paying power. From the examination made by the directors and officials of the bank and my own observation I am convinced that the bank is capable of earning and will earn and pay in the future its customary dividend of 4 per cent. per annum. I therefore enter into the following guarantee and covenant with reference to the payment of interest by the bank and intend to bind myself and my estate to the full extent of the following:

"*To the Depositors of the Savings Bank of New Britain:*

"I hereby guarantee the payment of the usual dividends of the Savings Bank of New Britain, at the rate of 4 per cent. per annum, on all deposits present and future, according to the practice and rules of the bank, for the period of two years, beginning with the dividend of July 1, 1907, that is to say the dividends payable July 1, 1907, January 1, 1908, July 1, 1908, and January 1, 1909. I hereby authorize and request said bank to pay said dividends to its depositors and I hereby agree to pay said bank the excess, if there should under any circumstances happen to be any excess, so paid, over and above the earnings of said bank earned during each six months prior to said dividend periods. I hereby recognize said bank as the agent and trustee of its depositors, without other or special authority from them, to enforce the guaranty hereinbefore made against me or my estate."

Mr. Corbin has also already advanced the sum of $25,000 for the apprehension of the absconding treasurer.

The Central Hardware Company, which has for some years done business at 311 Chillicothe street, Portsmouth, Ohio, has opened a branch store at 292 East Gallia avenue, in the same town.

TRADE WINNING METHODS.

This department is for the description of approved methods of carrying on and extending business, and a cordial invitation is given to merchants to co-operate in the effort to make it suggestive and of practical use to the trade.

A TEN-CENT SHOW WINDOW.

THE H. A. LEROY COMPANY, Osakis, Minn., has used with good business results what is termed a 10-cent window. The company makes selections from articles in the stock which usually retail for 10 cents, or that it may be desirable to dispose of for that amount of money. The window always contains some good values, the articles being arranged in as effective manner as possible. A large card appears in the window, reading as follows:

YOUR CHOICE FOR 10 CENTS

or

ANY ARTICLE IN THIS WINDOW FOR 10 CENTS

This window has an effect in several ways. It catches the eye; people get the idea that the merchant is selling goods very cheaply; and goods that it is desirable for one reason or another to get rid of are dispatched.

A FOUR-PAGE STORE BULLETIN.

C. B. SMITH, "Smith's General Hardware Store," Shrewsbury, Pa., in February began the publication of a monthly four-page folder in the interest of the store. The folder is about 6 x 9 in. in size and is nicely printed.

SMITH'S
General
HARDWARE STORE
Center Square
SHREWSBURY, PA.

Keep this with other sheets more will follow.

Have you taken advantage of the specials we are offering?

Vol. 1 APRIL 1, 1907 No. 3

Extraordinary Bargains

Heavy rolled steel, beautifully enameled outside in blue and white mottled, pure clear white inside.

10 quart seamless water pail, strictly first quality. Our special price 48c worth 75c

Berlin Sauce Pan

Beautiful blue, new goods, strictly first quality. Very special 29c size 6 quart

Pie Pans

9 inch Blue, extra deep, extra value 10c
Same Blue and White, extra value 13c

Dish Pans, Blue Ware

17 quart Extra Heavy First Quality 49c worth 75c

Water Pitchers

2 quart Gray 25c 3 quart Gray 45c
3 quart White 70c

Rice Boilers and Cereal Cookers Enamel

2 quart worth 60c 50c
3 quart worth 75c 65c

Garden Seeds

All New Seeds. Large Assortment. Price 5c per package.

FREE With every purchase of 3 packets 1 packet free, 5 packets 2 packets free, 10 packets 5 packets free

Valuable coupon free with each packet.

We have just received a large consignment of

Enamel Ware

every piece will be sold at wonderfully low prices

PUDDING PANS MILK PANS

1 qt. Blue and White 12c | 1½ qt. Blue and White 10c
1½ qt. Blue and White 14c | 2 qt. Blue and White 15c
2 qt. Blue and White 16c | 3 qt. Dark Blue 13c

Don't miss these specials.

FORKS

3 tine 4½ in. handle for barn and stable use Worth 65c. Special at 50c.

Batchellers Genuine Green Label, 4 tine Manure Fork 45c

Galvanized Oil Cans

Cone breast brass cap and chain 1 gallon. Special 19c
2 gal with screw caps 40c
5 gal. with faucet 60 and 75c
5 gal. with pump $1.25 and $1.50
3 gal copperized 35c
5 gal. copperized faucet $1.00

Have just received several extraordinary bargains in Enamel and Granite Ware, here is one of them,

17 qt. Dish Pan 25c, worth 50c.

First Page of April Store Bulletin (9 x 6 In. in Size) Issued by C. B. Smith, Shrewsbury, Pa.

Notwithstanding the small proportions of this store bulletin, with the conciseness of arrangement followed a good many articles are featured. Prices are mentioned in all cases and small cuts of the goods are freely and judiciously used. The February issue contains the following brief address "To Our Patrons":

> During the year 1907 we will be constantly on the lookout for specials that may be thrown on the market at a sacrifice price, therefore will be liable to have a special sale on the go at any time. If you will keep in close touch with us you reap the benefit; come to see us often.
>
> Our object will be to make your dollar go farther here than anywhere else.
>
> In quality we will aim to have the highest, and in price the lowest.

In carrying out this idea an effort will be made every month to have "specials" which will command the attention of the public.

We reproduce herewith the first and last pages of the April bulletin, which will give his brother merchants an

Renovating

This is the season our good wives are planning their spring work. House cleaning is here furniture must be brightened up, walls and inside wood-work must be painted, and many other things to be done to make our homes cozy and attractive.

Specials for House Cleaning

We bought the entire lot of these scrubs 1½ inch block thick by set with fibre special 4c

11 inch Tampico Stock, special 8c
12 inch Kabo Fibre, solid back, wax finish, tough and very cheap 10c
11½ inch made to fit the hand, Maple back, flexible fibre, worth 18c 12c
Stove Brushes, fibre 15, 20c
Stove Brushes bristle 25c
Window Brushes 50, 60c
Sink Cleaning Brushes 10c
Hand Brushes 05c
Shoe Brushes 35c
Globe Cleaning Brushes 05c
White Wash Brushes genuine bristle, home made 12, 15, 18, 20, 25c
Fibre, for fences 5 and 10c

Paint Brushes

Large assortment from 5c each up

SPECIAL

Liquid Veneer 50c size special 39c
10c size special 09c
For brightening up furniture nothing equals this preparation, try it.

Campbell's Varnish Stains All Shades
15, 25, 45, 65c and $1.60 sizes
Is unsurpassed for inside or outside decorations We also have cheaper stains.

JAP-A-LAC We could not keep going without this popular article Have a complete assortment, all shades in 15, 25 and 45c sizes.

Gold & Silver Bronze

Gold with large bottle of liquid and brush 20c
Gold in powder 25c oz.
Silver in powder 15c oz.
Segment to mix above.

Asbestos Irons

A HOT IRON A COLD HANDLE

Special price $1.50 per set of three irons hood and stand.

We call your attention to the enclosed booklet fully describing Asbestos Irons. Carefully read it We carry in stock, sets 3 irons each Numbers 66, 70, 100 and 120
Single Irons, Nos. 10, 40, 50 and 80

Sleeve Boards padded 25c
IRONING Boards $1.00

Brass Carpet Tacks 5c pack
Tinned and Polished Carpet Tacks 2c
Double pointed Matting Tacks 2c
Brass head Upholstery Tacks 5c

STEP LADDERS
At Money Saving Prices

4 ft. with Pail Shelf, extra strong iron brackets. Regular price $1.00 special 75c
5 feet well braced iron brackets regular price $1.00 very special at 62c
6 feet as above, regular price $1.25 extraordinary special at 72c

Something New

A 5 ft. Step Ladder, extra well braced with iron rods, pail shelf, by easy adjustment can be made into a 10 ft. ladder Just what you need. Special introductory price $1.65

Carpet Beater is made of three No. 12 wires twisted together very strong 10c

Poultry and Garden Fencing

Carefully read the enclosed circular about Pittsburg Perfect Fencing then place your orders with us for it. It is the best on the market.

Alabastine We have just received direct from the manufacture, a large consignment of Alabastine. It is a sanitary wall coating, more healthful than paper and very much cheaper 5 lb. package will cover 300 square feet 2 coats price white 50c tints 55c
We guarantee it not to rub off, and to make a solid job. We will cheerfully give any information desired.

Last Page of April Store Bulletin Issued by C. B. Smith, Shrewsbury, Pa.

idea of how Mr. Smith presents what he has to say to his customers, regular and prospective. About 1200 of these folders are sent out monthly to as many homes, passing them around in town and mailing to people in the country. They have been found quite effective in bringing in business and Mr. Smith is much pleased with the results of his enterprise.

REPEAL OF QUEBEC COMMERCIAL TRAVELERS' TAX.

COMMERCIAL travelers having business relations with the province of Quebec, Canada, will be interested to know that the tax for selling goods and showing samples in that part of Canada has been repealed. The tax when first laid, about two years ago, was $300 per annum for the current year or any part, but about one year ago the amount was reduced to $150. The laying of this tax, always unpopular wherever tried, has been attributed to Boards of Trade and other commercial bodies in that province and was applicable to salesmen not only from the United States and other foreign countries, but other Canadian provinces, the United Kingdom and colonies as well. One of the irritating and objectionable features of the ordinance was the horde of spies and informers it created, a large proportion of the penalties going to those causing an arrest.

Kewaunee Hardware Company, Kewaunee, Wis., has been incorporated with a capital of $15,000, taking over the business of C. V. Masbek, who is one of the incorporators.

Hardware Window Display

THIRD ARTICLE.

IN the two former articles of this series reference was made to the principle of concentration in window displays; that is, devoting an entire window to one article or line. The object of this is to rivet the attention of the observer and induce an inquiry and possible purchase, or, at least, impress upon him the fact that the goods shown are liberally stocked in the store. In this connection illustrations were shown of a Cutlery window and several devices for displaying Cutlery.

An excellent example of a display devoted to one particular line is shown in Fig. 6, representing a window full

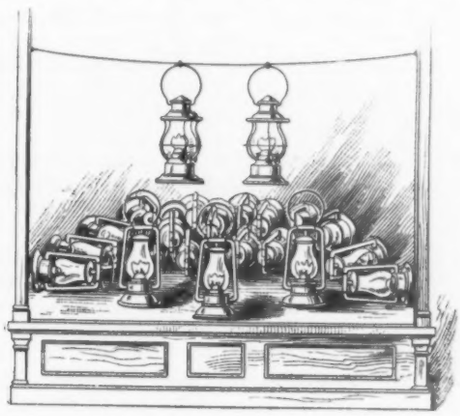


Fig. 6.—Lighted Lanterns in the Daytime.

of Lanterns arranged in a semicircle occupying the entire front of a window. The effectiveness of the display is enhanced by showing some of the Lanterns in actual use, as indicated in the cut. Lighted lanterns in the daytime are pretty sure to attract attention, while with good oil and careful trimming they can be exhibited in an especially favorable way. The burning Lanterns might also be subjected to a draft from an Electric Fan, showing the steadiness of the light under such conditions.

Lighted Lanterns.

Orderly Disorder.

The Lantern illustration suggests another form of display which may sometimes be used and may be char-

Fig. 7.—Window Full of Nails.

acterized as orderly disorder. The idea may be best employed with articles that are identical or very similar in size. A window may be filled with goods like this in original packages, either neatly arranged or thrown together with apparent haste, suggesting an extensive stock. A limited number of articles may be removed from the packages or bundles and occupy a prominent or central place. Such articles as Shovels, Snow Shovels, Pails and Tubs, Wrenches, Hatchets and many other lines of tools can effectively be presented in this way.

Bulk Displays.

Even Nails, Bolts, Screws, Chain, &c., lines rarely seen in the show window may be effectively presented in bulk. Fig. 7 affords a suggestion for a very striking window display of Nails, which most people would be likely to look at twice. The background is formed by full kegs of Nails, which may be shown with the heads both on and off, and the bed shelf in the foreground is filled with 10 D Nails in bulk, which seem to be a tremendous quantity. In such a display it is, of course, necessary that bulk goods should be all of the same size, since it would be impracticable to separate different sizes after they had once been mixed up.

A window full of Stove Pipe would afford another example of this kind and also of the concentrated style of window. Such a display might be given point and added interest by some sort of a pat or witty sign like the following:

Stove Pipe Display.

> *You do not have a fit when you put up our stove pipe, it is the pipe that has the fit.*

Tools Hung on Looped Wire.

An ingenious and effective way of displaying tools in a show window and inside the store as well is suggested in Fig. 8. The idea is equally applicable to individual

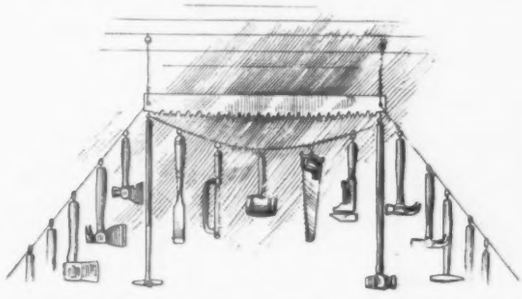


Fig. 8.—Tools Hung from Loops of Wire.

lines shown separately or to a number of lines combined. A Crosscut Saw is suspended from the ceiling or from the top of the window and a long piece of wire is attached to each end, being carried downward at an angle according to the size or shape of the window. At intervals of about a foot the wire is looped and the Tools are attached by Screw Hooks screwed into their handles and hung in these loops. A person of ingenuity can readily devise other means of attaching such Tools as do not have handles that can be used in this way. The device affords an opportunity for prominently displaying a large number or variety of Tools without using any valuable shelf or counter space. Wires can, of course, be hung between many different points in the store without interfering with needed room.

The principle of concentration seems to have originated in department stores, where such a large number of different lines are carried or where lines show so much variety that concentrated displays are entirely feasible. A whole window could easily be given up to shirts or neckties or traveling bags and accessories, and the difference in the materials, colors or patterns would afford an almost unlimited field for effective presentation. Hardware stocks do not show so much variety, at least of the sort comprehended by the general public. To most people a Hatchet is a Hatchet and a Saw a Saw, while all Auger Bits present the same general appearance and characteristics. For this reason, as well as because Hardware stocks do not contain a sufficient number of distinct lines to afford frequent changes, it is obviously good judgment to make use of general displays from time to time, so that if people are not attracted by one

Variety Desirable.

Every Day Goods.

thing they may be by another. Such displays would usually be made up of articles in every day use and demand. There are two classes of goods, however, of which it may be said in a general way that it is better to display them on the concentrated plan. These are season goods and novelties. The latter, as a rule, should be shown in such a way as to demonstrate their construction and use.

Novelties.

(To be Continued.)

THE FRASSE COMPANY'S EMBLEM.

THE FRASSE COMPANY, 134 Liberty street, New York, handling machinery, hardware, tools, metals and supplies, use the design shown in the accompanying cut, as a distinctive mark identifying the house and stock. The mark is an old Japanese figure, without any particular significance in its present adaptation, except its uniqueness and dissimilarity from other designs used for similar purposes. The border and the figure through the center are in black, while all the lettering and the rest of the space within the circle is in red. The mark is used on stationary, business cards, packages of goods, handles of tools, shipping cases, in show windows, store signs and elsewhere. For these various uses the mark is made in different diameters. For use on small packages of goods sold over the counter the mark is 1½ in. in diameter, gummed on the back, and is pasted on packages by the salesman, over the edge of the wrapping paper to hold

The Frasse Company's Emblem.

it in place, instead of using twine for this purpose. It is used in decalcomania form for handles of tools of small size and in the same form but much larger for show windows. An enameled metal name plate of this design is used on machinery. There is no doubt an advantage in having goods from a store instantly recognizable from some peculiar mark wherever seen, as it impresses the store and the business upon the minds of customers and others.

THE STANDARD CHAIN COMPANY OF CANADA.

THE STANDARD CHAIN COMPANY has for a number of years enjoyed quite an extensive trade in Canada, and interests closely associated with this company have made application to the Canadian Government for charter to manufacture Chain in that country. The company will be known as the Standard Chain Company of Canada, Limited. A site has been selected at Walkerville, Ont., and plans are now being prepared for a new building, which will be thoroughly fireproof in construction. This point has been selected on account of its special advantages, both for lake and rail shipments. Ground has been purchased and the work on the erection of this factory will commence in the very near future. It is anticipated that the factory will be in full operation the coming summer. A full line of Coil Chain, as well as Harness Chains, will be manufactured. The Standard Chain Company is now operating eight plants in various parts of the United States, all of which are in full operation. While originally there were 13 different corporations merged into the company, the policy of concentration into a smaller number of plants has been adopted, but the large and growing trade in Canada has compelled the erection of a separate plant there.

K. G. McRae Hardware Company has succeeded K. G. McRae, Hope, Ark.

REQUESTS FOR CATALOGUES, &c.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM DOAK-MACKEY HARDWARE COMPANY, Wetumpka, I. T., which has been incorporated with a capital of $15,000, and will conduct a wholesale and retail business in General Hardware, Stoves, Implements, Paints, Sporting Goods and Vehicles. The company will occupy a new two-story building, 50 x 140 ft. in size.

FROM AXTELL & SON HARDWARE COMPANY, La Cygne, Kan., which has succeeded Root Hardware Company.

FROM MONTGOMERY BROS., who have succeeded to the Shelf and Heavy Hardware, Stove, Vehicle and Sporting Goods business of W. S. Price, Oak, Neb.

FROM S. B. BARKER COMPANY, Condor, Ore., general merchandise, which has purchased the stock of Hardware and furniture of Geo. H. C. Earhart.

FROM DUESTERBERG & PEPPLE, St. Francisville, Ill., successors to H. H. Duesterberg. The new firm will increase the Hardware stock, and in addition will add Farm Implements, Buggies and Wagons.

FROM COBB, WHYTE & LAEMMER COMPANY, 45 Clark street, Chicago, Ill., carrying Builders' and General Hardware, Cutlery, Tools and Contractors' Supplies.

FROM G. E. RUSSELL & Co., Holyoke, Mass., handling Shelf Hardware, Mill Supplies, Farming Utensils, Kitchen Furnishings, &c.

FROM AINSLIE-MARTIN COMPANY, Incorporated, successor to Ainslee & Martin, Lynchburg, Va., jobber of Hardware, Stoves, Tinware, Sporting Goods, &c.

GEO. COLLIS, for the past 13 years secretary and treasurer of the Andrews Wire & Iron Works, Rockford, Ill., has joined his sons in their business, the Collis Wood & Metal Mfg. Company, at Dubuque, Iowa. This business will be at once incorporated under the style of the Collis Company. It is the intention of the Messrs. Collis to add considerably to their line, and they are at present figuring on some goods which will be placed on the market at an early date. At present their specialty in the machinery line is Pattern Makers' Sanding Trimmers, and in the wire goods line Refrigerator Shelves, the latter being made for a number of the Refrigerator manufacturers of the country.

MECHLING & DAYCOCK, 81-83 Fulton street, New York, handling all kinds of metal goods, especially for building purposes, have recently been appointed Eastern representatives for the Edwards Mfg. Company, Cincinnati, Ohio, which manufactures Metal Ceilings and Shingles, Corrugated Iron, Conductor Pipe, Eave Trough and numerous kinds of finished products in the way of sheet metal building material. They have also been made Eastern representatives for Cooney & Geiger, Indianapolis, Ind., who manufacture the Centennial Rain Water Cut Off, with both right and left wire.

THE BRADY & BLACK HARDWARE COMPANY, succeeding Brady & Black, Temple, Texas, has been incorporated with a capital stock of $40,000. The incorporators are Wm. A. Brady, Duncan A. Black, Wm. F. McGregor and Joseph C. McKeehan, Jr. The business covers Hardware, Sporting Goods, Paints, Steam Goods, Stoves and House Furnishings, wholesale and retail.

LUCAS & BARRICK, Altoona, Kan., have been succeeded by F. M. Lucas & Co.

BANQUET OF MANUFACTURERS OF SHEET METAL GOODS.

THE third annual dinner of the Manufacturers of Sheet Metal Goods was given at the Waldorf-Astoria Hotel, New York City, Wednesday evening, April 17, the attendance being much larger than on previous occasions. The guest of honor was Walter M. Aikman, president of the Central Stamping Company, New York, who has just completed his sixtieth year of service in the tin ware business.

There were nearly 100 subscribers, including representatives of the National Enameling & Stamping Company, Lalance & Grosjean Mfg. Company, Republic Metalware Company, W. H. Sweeney Mfg. Company, Bronson-Walton Company, Wheeling Corrugating Company, American Can Company, Geuder & Paeschke Mfg. Company, Central Stamping Company, F. H. Lawson Company, Dover Stamping & Mfg. Company, Delphos Mfg. Company, Enterprise Enamel Company, United States Stamping Company, Budke Mfg. Company, P. C. Buttorff, John Dunlap Company, Coonley Mfg. Company, Chattanooga Roofing & Foundy Company and Phillips & Buttorff Mfg. Company.

Among the speakers were Walter M. Aikman, Thomas K. Niedringhaus, James F. Foster, Charles A. Paeschke, William H. Matthai and Edward B. Brown. The function was arranged, as heretofore, by George P. Benjamin of New York, who presided.

THE ARKANSAS CONVENTION

THE Arkansas Retail Hardware Association, Charles E. Taylor, secretary, Little Rock, will hold its annual meeting in Little Rock on June 11, 12 and 13. The headquarters will be at the Hotel Marion, a modern fireproof structure recently opened to the public. The outlook is for a fine meeting with a large attendance of merchants. A large representation of jobbers and manufacturers is also expected.

KAMPFE BROS., 8-12 Reade street, New York, inventors and manufacturers of the Star Safety Razor, Star Interchangeable Razor, Star Safety Corn Razor, Diagonal Strop and Stropping Device, &c., are calling the attention of the trade to the quality and lasting features of their Safety Razor Blades, in competition with the wafer or uniform gauge steel Blades for Safety Razors. The Star Safety Razor Blades, it is stated, are made from the highest quality double refined English steel, the crystals of which, of very fine grain forming the teeth or cutting edge, can only be seen under a magnifying glass. The Blades, which go through over 30 processes from the raw material to final inspection, are hand forged, full hollow ground or concaved, and each Blade is handled separately to secure greater uniformity in temper. The Blades are recarbonized before hardening to get best results, and then the outer shell, which is more or less unfavorably affected, is ground away, thus using only the core or heart of each piece of steel to make the finished Blade.

R. K. CARTER & Co., 66 and 68 Reade street, New York, announce that their Pittsburgh branch, of which E. S. Cox is manager, is now installed in new quarters in the 20-story Commonwealth Building, Fourth avenue, which is in the center of the steel and iron and financial district of Pittsburgh. This location affords larger quarters, which were necessitated on account of the firm's growing business and consequent increased office force.

J. H. Williams & Co.'s. Drop Forging Plant.

Sixth Article.

The basement of the newest portion of the main building is about 50 x 150 ft. On account of the great value of the contents of this portion of the works, including thousands of sets of dies, finished and partly finished, special care was given to making it absolutely dampproof. The solid concrete floor is 36 in. thick, the floor and side walls being built of the best materials for such a purpose. In this room there is an immense bin capacity, so admirably planned and constructed that the stock clerk or his assistants can instantly locate any required part or finished article, the bins having been designed and built to hold an immense weight. The goods so stored, Fig. 28, are grouped in classes and graduated in sizes, each section containing many bins, being lettered A to V on one side of the center passageway and AA to VV on the opposite side. The bins are largest below and smallest above, reaching clear to the ceiling. The upper tiers are reached by rolling ladders in each aisle, one ladder serving two sides of an aisle.

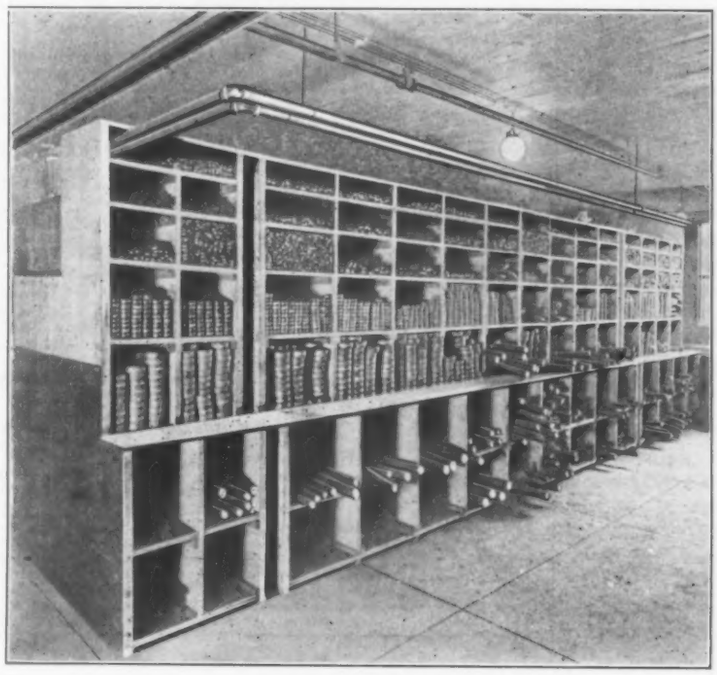


Fig. 28.—View of One of the Stock Bin Sections.

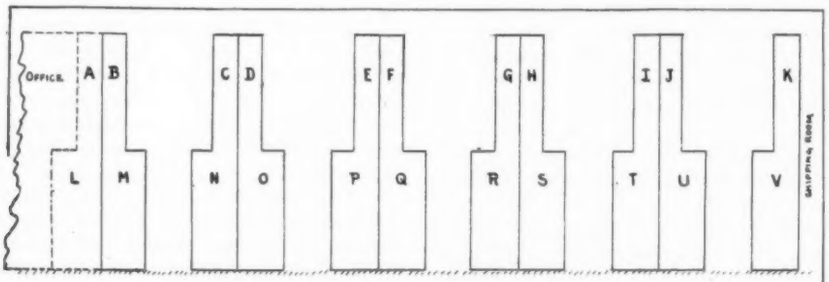
Stock Bin Chart.

To enable individuals to locate bins containing wanted goods, a large framed chart, 18½ x 23½ in., glass covered, Fig. 29, is hung conveniently in the central passageway, for consultation as occasion requires. Where the minutiæ of a system are so great it is absolutely necessary not only to have the stock to draw from at short notice, but to be able to find it without hesitancy or delay, the bins in the aggregate numbering many thousands in this department alone. The diagrams at top of Directory show the arrangement of bins from bottom to top on one side of the passageway, the other bins being lettered A A to V V consecutively.

Storage of Dies.

It is obvious that in a drop forging plant, producing an infinite variety of forgings from very small to large pieces, wholly or partly finished, entirely aside from the products marketed by the company itself, the proper storage of sets of dies is especially important, reaching as they already do to nearly five figures in number. For the care of these dies two large spaces in the basement have been allotted, one in the new portion and one in the older

part of the main building. The essential requirement is so to place them in the strong stacks or racks that any pair is immediately available and free from likelihood of injury. This department is in charge of an expert tool-maker, who, with three assistants, is responsible for the proper care of the dies, most of which are active. Fig. 30 illustrates the die storage room in the older structure, there being many racks, those against the walls being accessible from the front only, the others having approaches from four sides, with roomy aisles, so that a hand truck can reach any part with the dies. The more bulky pieces frequently rest on the concrete floor and against the bins. For quick reference there are numbers of typewritten schedules on bulletin boards covered with glass, the die numbers in consecutive order from 1 up having against each number the section and other data by which any one seeking a particular die can at once determine its position. These bulletin boards, of which there are several, are hung at convenient points. The dies themselves have corresponding numbers struck in the metal for identification.



DIRECTORY OF STOCK ROOM.

FIRST FLOOR.

SECTION	WRENCH NO	SECTION	WRENCH NO.	SECTION	WRENCH NO	SECTION	EYE BOLTS TH'D
O	00 UP TO 5 INCLUDING 5 MILLED	H	2356 UP TO INCLUDING 2036 MILLED	R	602 UP TO INCLUDING 640 MILLED	P	5/16 TO INCLUDING 1" U.S STD
V	5 " " 8008 "	G	2040 " " 2356 "	JJ	602 " " 640 SEMI FINISH	P	5/8 12 THDS
JJ	00 " " 2 SEMI FINISH	GG	2356 " " 2637 SEMI FINISH	B	602 " " 640 FINISHED	P	2" UP TO INCLUDING 3/4 U.S. STD
UU	8 " " 5008 "	RR	2356 " " 2637 "			A	WHITWORTH & V THREADS
B	00 " " 2 FINISH	DD	2356 " " 2634 FINISHED	I	629 UP TO INCLUDING 640 MILLED		MACHINE HANDLES
M	5 " " 5008 "	OO	2634 " " 2356 "	JJ	629 " " 640 SEMI FINISH	R	00 UP TO INCLUDING 10 MACHINE EYE BOLTS
				BB	629 " " 640 FINISHED	RR	10 1/2 UP TO 5 INCLUDING 1 1/4 CRANK HANDLES
J	21 UP TO INCLUDING 86 MILLED	P	801 UP TO INCLUDING 850 WHITWORTH			R	5/16 TO 5/8 INCLUDING 10 DIAMOND
U	50 " " 64 "	N	1214 " " 3984 SEMI FINISH	I	720 UP TO INCLUDING 740 MILLED	PP	D " " 15 FINISHED
II	21 " " 35 SEMI FINISH	MM	1214 " " 3984 FINISHED	HH	720 " " 740 SEMI FINISH	O	LATHE DOGS 1 UP TO INCLUDING 1 3/8
TT	36 " " 64 "			BB	720 " " 740 FINISHED	D	21 " " 25
BB	21 " " 29 FINISHED	I	3984 UP TO INCLUDING 3986 MILLED			O	84 " " 35
MM	30 " " 64 "	JJ	3984 " " 3986 SEMI FINISH	I	7198 UP TO INCLUDING 7198 MILLED	P	42 " " 48
		B	3984 " " 3986 FINISHED	HH	7198 " " 7198 SEMI FINISH	EE	THUMB NUTS STYLE A & B UP TO INCLUDING 2 1/2
Q	65 UP TO INCLUDING 84 MILLED	K	442 UP TO INCLUDING 442 MILLED	BB	7198 " " 7198 FINISHED	A	" A & B WHITWORTH-V- 12 THDS
QQ	65 " " 84 SEMI FINISH						THUMB SCREWS BRASS
EE	65 " " 69 FINISHED	KK	442 " " 442 SEMI FINISH	I	820 MILLED	C	STYLE A 1/4 1/2 3/4 1 1 1/4
PP	70 " " 84 "	B	442 " " 442 FINISHED	HH	820	C	" B 1/4 1/2 3/4 1 1 1/4
				65	820 SEMI FINISH	D	" B 1/4
Q	82 UP TO INCLUDING 103 MILLED	K	4568 UP TO INCLUDING 4568 MILLED	BB	820 FINISHED	D	" C 1/4 1/2 3/4
QQ	82 " " 103 SEMI FINISH	JJ	4568 " " 4568 SEMI FINISH	Q	825 UP TO INCLUDING 841 MILLED	E	" C 1/4 1/2 3/4 1
EE	82 " " 95 FINISHED	B	4568 " " 4568 FINISHED	QQ	825 " " 841 SEMI FINISH	E	" D 1/4 1/2
PP	96 " " 103 "			NN	825 " " 841 FINISHED	F	" D 1/4 1/2 3/4 1
		6	475 UP TO INCLUDING 480 MILLED			F	" E 1/2
K	117 UP TO INCLUDING 117 MILLED	55	475 " " 480 SEMI FINISH	T	821 UP TO INCLUDING 882 MILLED	G	" E 1/4 1/2 3/4 1
JJ	107 " " 117 SEMI FINISH	OO	475 " " 480 FINISHED	55	821 " " 882 SEMI FINISH	G	" F 1/4 1/2 3/4 1
B	117 " " 117 FINISHED					G	" G 1/4 1/2
		I	501 UP TO INCLUDING 508 MILLED	P	5402 UP TO INCLUDING MILLED	G	" H 1/2
K	124 UP TO INCLUDING 142 MILLED	T	508 " " 512 "	P	5402 " SEMI FINISH		THUMB SCREWS TH'D U.S. STD
JJ	124 " " 142 SEMI FINISH	HH	501 " " 508 SEMI FINISH			CC	STYLE A 1/4 1/2 3/4 1 1 1/4
B	124 " " 142 FINISHED	55	508 " " 512 "	Q	971/2 " MILLED	CC	" B 1/4 1/2 3/4 1 1 1/4
		BB	501 " " 508 FINISHED	QQ	971/2 " SEMI FINISH	CC	" C 1/4 1/2 3/4 1 1 1/4
K	204 UP TO INCLUDING 220 MILLED	OO	508 " " 512 "	NN	971/2 " FINISHED	CC	" D 1/4 1/2
JJ	204 " " 220 SEMI FINISH				SPECIAL WRENCHES	EE	" D 1/4 1/2 3/4
BB	204 " " 220 FINISHED	T	513 UP TO INCLUDING 530 MILLED	AA-L	WHITWORTH MILLED	EE	" E 1/4 1/2 3/4 1
		55	513 " " 530 SEMI FINISH	AA-LL	WHITWORTH SEMI FINISHED	EE	" F 1/4 1/2 3/4 1
T	223 UP TO INCLUDING 230 MILLED			AA-LL	WHITWORTH FINISHED	EE	" G 1/4 1/2
55	223 " " 230 SEMI FINISH	H	2356 UP TO INCLUDING 5402 MILLED	AA	POTTER MILLED	EE	" H 1/2
NN	223 " " 230 FINISHED	II	2356 " " 5402 SEMI FINISH	AA	POTTER FINISHED	A	SOCKET SCREWS WHITWORTH-T- 12 THDS
		BB	2356 " " 5402 FINISHED	LL	AMERICAN LAC MILLED	A	TACKCLAWS
				S	ECCENTRIC "		

Fig. 29.—Chart of Stock Bin Sections.

pipes and what service they perform, each line is given a different color, somewhat as follows: Steam, black; gas, green; sprinkler system, maroon; water and waste, white; for electric wires, gilded, and radiators, bronzed.

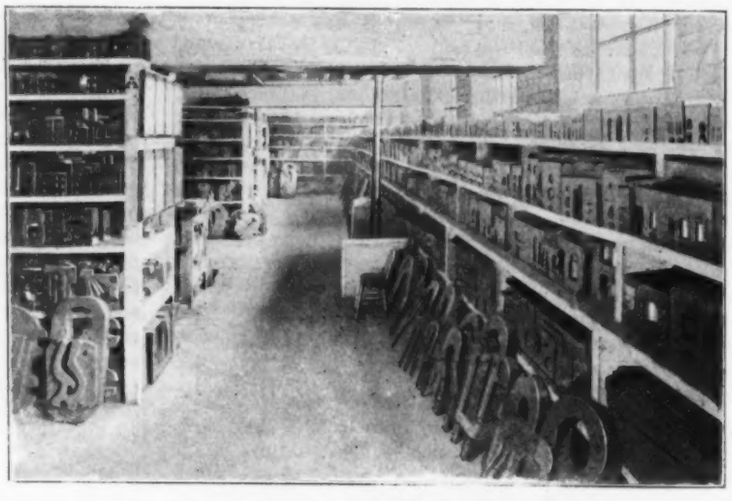


Fig 30.—A Section of One of the Die Storage Rooms.

Repairs.

The various pipe systems throughout the works are kept in constant repair by a force organized for that particular purpose, consisting of a foreman and several assistants, the head plumber of foreman being also a tin and sheet iron worker as well. Large jobs of new work are usually contracted for and the work done by outside workmen. To know the nature of the various

The handling and distribution of stationery, office and other supplies has also been placed on a systematic basis.

to economize both expense and time, some of the forms used for requisitions being here reproduced to illustrate a portion of it. Aside from the printed matter on the slip used the color indicates the purpose for which it is employed. Fig. 31, "stationery slip, is on white paper, 4⅞ x 7⅛ in. in dimensions, and represents an order on

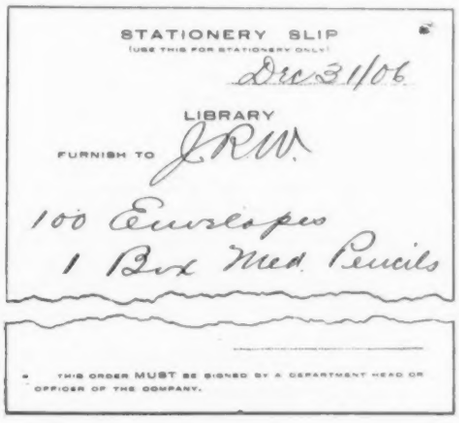

STATIONERY SLIP
(USE THIS FOR STATIONERY ONLY)
Dec 31/06
LIBRARY
FURNISH TO J.R.W.
100 Envelopes
1 Box Med. Pencils
THIS ORDER MUST BE SIGNED BY A DEPARTMENT HEAD OR OFFICER OF THE COMPANY.

Fig. 31.—Requisition Slip for Stationery.

the office library from some one in the office for 100 envelopes and one box of medium pencils. Fig. 32, same size, calls for copies of estimates Nos. 3162, 4856, &c., from the files in the office library. Fig. 33 is a request to those in charge of the office library to furnish to Mr. Moore

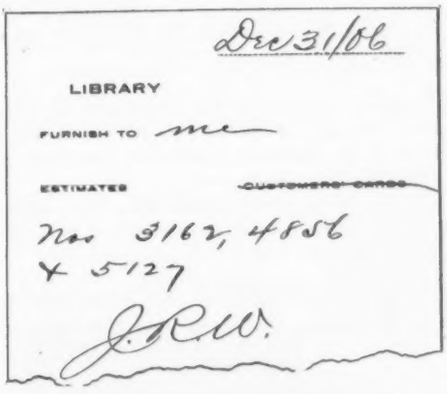


Fig. 32.—Order on Office Library for Copies of Estimates.

"orders" or "letters" of Messrs. Black & Gray, dates specified; in this instance letters are wanted, there being a line drawn through the word orders.

There are also many other clever methods of quickly and accurately conducting the various details of the busi-

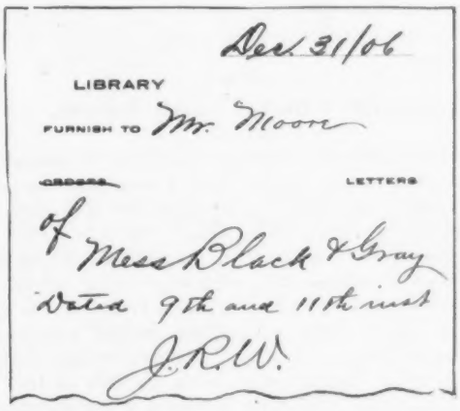


Fig. 33.—Form Used When Correspondence Is Wanted.

ness, without confusion or loss of time, which likewise localize and fix responsibility.

[THE END.]

Export Trade Topics.

PRACTICAL SUGGESTIONS ON EXPORT TRADE.

Second Article.—Packing *(Continued.)*

Charging customers for boxing should be avoided whenever possible. In a great many ways it is far better to calculate the expense necessitated by careful boxing for export in the first quotation of prices. The familiar phrase, "boxing charges at cost," means nothing whatever to the foreigner; he cannot even guess what the goods are ultimately likely to cost him, and is always suspicious of the good faith back of the "cost."

Checking and Counting.

Unusual care must be taken in counting and checking the contents of all cases for foreign shipment, and in making assurance doubly sure that every item down to the smallest screw is shipped, and is of the right sort and size. Manufacturers can hardly imagine to themselves the annoyance caused to foreign customers by carelessness in this matter, and unfortunately such neglect is much too common.

Complaints by foreign customers as to shortages are frequent also. Sometimes goods are stolen while *en route*. This can be guarded against, as will be seen when insurance is discussed. Sometimes, undoubtedly, foreign clients are disposed to take advantage of distant manufacturers, but even then it would seem better to risk an occasional fraud than to antagonize possibly good customers with "affidavits" from cock sure shipping clerks that invoiced quantities were actually shipped. Imagine the feelings of a foreign customer who has seen a case opened and personally observed that it was full to the brim, yet lacked a package of a dozen articles called for by the invoice, when his claim is met by a thinly disguised insinuation by the manufacturer that he is not telling the truth. This is another instance that fell under the writer's observation last year, and that manufacturer very justly lost a customer, for the customer knew that there was no room in the case for the parcel which the manufacturer swore was packed in it.

Penalties for Errors.

A study of custom house requirements of the country for which goods are destined is a part of the duties of an export shipping clerk. He must learn in what countries nickeled articles or parts of articles must be packed separately in order to avoid entailing extra rate of duty on all other goods in the same package, and in what countries no advertising matter or catalogues should be packed in cases with merchandise. Or, again, where separate net weights of all different sorts of merchandise in one package must be specified.

Marking Samples Unmistakably.

In shipping samples each separate article should be tagged with a number, name or other mark for identification. The consignee should not depend for this information on the boxes or cartons in which the samples are originally shipped. In many custom houses always, and in all custom houses at times, each and every article is carefully examined, and the inspectors are seldom very particular about replacing articles in the identical envelopes from which they were taken. It has happened repeatedly that on this account foreign importers have been unable to identify samples from accompanying invoices, have "guessed" wrong, with consequent loss of time and disappointment on both sides in the execution of resulting orders. A tag or mark should be attached immediately to the body of the sample, whether or not it can be identified by the box in which it is.

Similarly every part of an article shipped "knocked down" should be tagged or marked with clear information as to what it is and where it is to be placed in the

assembling of the whole. Never leave the smallest detail to the guesswork of the consignee. It may appear the simplest thing to the manufacturer himself and he may have a distinctly poor opinion of the intelligence of the foreigner unable to tell at a glance just what's what, but it may be that the article is absolutely new to the consignee. Neither he nor any of his clerks may ever have seen anything like it. Even if he has highly trained engineers in his employ they may be able to do no better than guess at some parts of a mechanism they are absolutely strange to. It is far better and safer to err on the side of simplicity and exactness.

Packing Machinery for Export.

An interesting article on the packing of machinery for export shipment has been published in *Daily Consular and Trade Reports*, No. 2817, dated March 14, 1907, which embodies more practical advice in this regard than has often been brought together. Copies may be obtained probably by any one interested by addressing the Department of Commerce and Labor, Bureau of Manufacturers, Washington, D. C. This article was reprinted by *The Iron Age* in its issue of March 21 last.

Marking Packages.

Always mark packages for export shipment in ink; never use pencil or attach tags. If the use of tags is absolutely unavoidable they should be of metal or other indestructible material, and the address must be stamped or otherwise indelibly indicated. But tags are seldom, if ever, excusable. Marks on all naked goods, machine parts, castings, or tubes, for example, should be painted directly on the pieces.

No shipper, except a novice in export business, ever marks export goods with the full name of consignee. For one reason, because so doing involves unnecessary clerical work in bills of lading, and the innumerable other documents involved at every step of their progress; another because it reveals the names of clients to competitors and exporters. The usual form is to express the name of the consignee in initials or arbitrary letters or symbols only, such as triangles, diamonds, circles, stars, &c., followed by the name in full of the city of ultimate destination. Thus:

BERLIN.

Each case should be numbered consecutively. In addition each should be marked with the gross and net weights and its dimensions. Thus: Gross, 200 lb; net, 150 lb.; 18 x 24 x 28 in. For shipment to some countries the weight must sometimes be expressed in kilograms, but this is one of the particulars in which the instructions received with the order must be implicitly followed. It seems superfluous enough to urge care and exactness in making these weights and measurements. Yet that necessity must be emphasized, for American manufacturers are notoriously inexact in these details. Perhaps as high as 25 per cent. of the weights and measurements supplied by manufacturers with their shipments are incorrect, sometimes absurdly wide of the mark.

Good Packing Better than Cover Directions.

As a rule there is little advantage gained in marking cases destined for foreign countries with such customary phrases as "This side up," "Top," "Bottom," "Use no hooks," "Fragile," "Handle with care," "Stow away from boilers," &c. At best little attention is usually paid to these instructions. The shipper should not imagine that he can take refuge behind them when goods arrive at destination in bad condition. The shipper himself must provide, in his factory, against the certainty of rough handling by taking every precaution in packing, even anticipating that machines will be stowed in all sorts of positions despite his marks. Yet such cautions do not harm and are often advisable, especially for countries where the English language is spoken or commonly understood.

The manufacturer should remember that in the case of goods intended for countries where Spanish, French, German or other languages are spoken, the English expressions often convey no meaning at all to local stevedores. It may be noted that some German shippers supplement their usual marking with an equivalent phrase in the language of the country to which goods are destined. To impress the lesson of carefulness and intelligence, needed even in these minor details, the story may be told of five cases of machinery recently shipped by an American manufacturer bearing the legend, "This side up," conscientiously imprinted in tall characters on two opposite sides of each case. Curiously enough, it proved on opening the cases that neither side so marked was actually "top," and it was only by a bit of good luck that but one of the machines was damaged.

Packing Lists.

For each foreign shipment a packing list must be supplied, which should usually be written in triplicate. This list ought to itemize exactly the mark and number, gross and net weight, cubic dimensions and contents of each case in full. The three copies of the packing list accompany the invoices. The packing list may sometimes be omitted in the case of small shipments, when the above details are all shown and clearly indicated on the face of the invoice itself.

(*To be continued.*)

AMONG THE HARDWARE TRADE.

W. E. Redwick has purchased a half interest in the Hardware business of B. P. Youman, Vancouver, Wash.

Iola Hardware & Furniture Company, Iola, Texas, has been incorporated with a capital of $10,000.

R. Blumenstein has recently opened a Hardware, Stove, Tinware and Furniture store at Elgin, Ore.

Carey & Kepple have succeeded to the Hardware business of W. E. Carey, Baldwin, Kan.

Announcement is made of the dissolution of the firm of Grambs & Wolbert, Bismarck, N. D., which has been succeeded by G. W. Wolbert Hardware Company.

J. T. Adams & Co., Greenwood, Mo., have been succeeded in the Hardware business by Adams & Miller, D. S. Miller having bought a half interest in the firm.

Hall & Hall have opened a new Hardware, Stove, Paint, Sporting Goods, Implement and Vehicle store at Cadams, Neb.

MISCELLANEOUS NOTES.

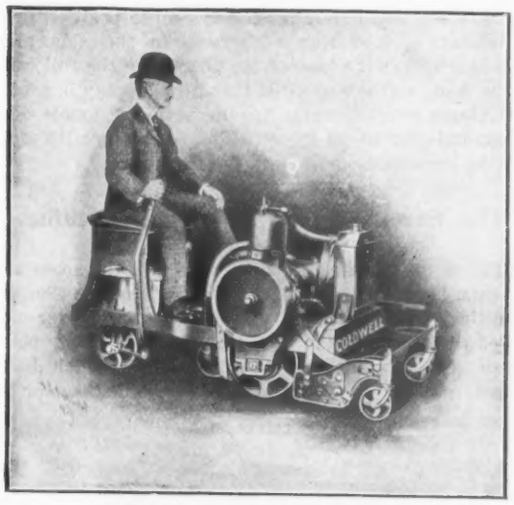
Gem Antirust Hooks.

The Columbian Hardware Company, Cleveland, Ohio, New York office, 168 Church street, is now finishing Gem steel coat, hat and wardrobe hooks, with a special enamel, and putting them on the market under the name of antirust hooks. The enamel is alluded to as being much tougher than other finishes, preventing the wire from rusting. The goods are packed one dozen in a box, and the box is sealed.

Coldwell's Motor Lawn Mower.

The Coldwell Lawn Mower Company, Newburgh, N. Y., has added to its line this year a new gasoline motor lawn mower, propelled by a two-cylinder four-cycle motor of 14 hp. It cuts a 40-in. swath, and it is stated will climb 20 per cent. grades. It is steered by a wheel after the manner of automobiles, with controlling reverse for spark and throttle within convenient reach of the operator. It can be built with grass catcher attachment. Other motor mowers made by this house include Style A, which is run by steam power, using gasoline as fuel and cuts a 40-in. swath, and Style B shown in the accompanying cut, which is driven by a single-cylinder two-cycle motor and cuts a 35-in. swath. All these machines have the mower attachments separate, and projecting from the front by means of two-hinged arms, a lever being used to raise the mower clear of the ground when crossing gravel

walks or running on roads or when the machine is used as a roller. The weight of the mowers ranges from 1200



Coldwell's Gasoline Motor Lawn Mower.

to 3000 lb. It is declared that they are easily operated, economical of fuel, and will do more and better work than two horse mowers.

New Home Washing Machine No. 60.

The accompanying cuts show an addition to the line of washing machines, made by the Standard Mfg. Company, Shelby, Ohio. The washer has a detachable wringer board, so that the operator can wring from the machine tub to the rinsing tub; also from the rinsing tub to the basket, without changing the wringer from the board during the entire process of washing. Fig. 1 shows the washer with wringer upon the swinging wringer attach-

Fig. 1.—New Home Washing Machine No. 60.

ment, swung out of the way, where it remains while the clothes are being washed. When ready to wring out the clothes the wringer upon the swinging wringing board is swung around to the proper position to wring the clothes from the machine tub, as shown in Fig. 2. With this device the wringer is always in place to wring from either position with the right hand, which is alluded to as an important improvement. The washer is one of the oscillating type, where the tub turns to the right and to the left, about one-half turn around, carrying the water and clothes with it. The tub has ribs in the bottom. A whole tub full of clothes is put in at a time, with water, and the top rubber is put on, which is held stationary while the tub with the clothes and water rotate to the right and left, coming against the reversing springs at the end of each stroke. This has the effect of producing a miniature whirlpool within the tub, which with the light rubbing surface going on at the same time, both at top and bottom and the forcing of the water through them by this violent action and suction cleanses the clothes, it is stated, in 5 to 10 min. for a whole tub full at a time. Anything can be washed, it is stated, from a carpet to the finest lace curtains, without injury. The tub is made from Louisiana cypress, and bound with three steel wire electric welded crimped hoops, embedded in the staves of the tub by the crimping process after the hoops are in place, to render it impossiible for them to come loose. The

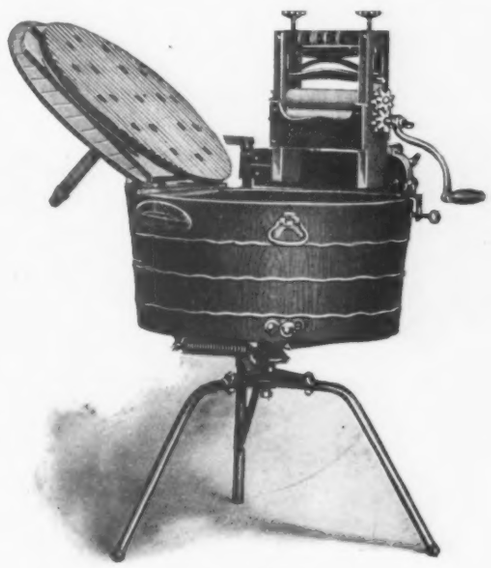


Fig. 2.—Wringer in Position to Wring Clothes.

cover is the company's improved corrugated top rubber and hinged cover shown in Fig. 2. The washer has no center post or other obstruction inside the tub.

Schlueter's Rapid Sander.

M. L. Schlueter, 15 W. Madison street, Chicago, is making the floor surfacing machine here shown. The cut represents type B, which is equipped with a 2-hp. motor. It has a machine bed 16 x 19 in. in size and an 8 x 18 in. roller, covered with pure rubber on which carborundum cloth or sand paper is applied. To remove or replace the cloth or paper it is only necessary to turn the key in the side of the roller. The roller is held in position by side plates with springs above and below the journal box, allowing the roller to adjust itself to the floor. The

Schlueter's Rapid Sander.

side plates are adjusted to the side of the machine bed, so that the chain drive from motor may be taken up or the roller may readily be removed. Every machine is equipped with a dust collector, the weight of motor with dust collector being about 150 lb. The weight of roller with side plates is about 75 lb. It is explained that type B will surface from 2000 to 3000 sq. ft. of floor

per day. The maker states that the machine is adapted for all kinds of floors from fine residences, stores and office buildings to halls, rinks, bowling alleys, &c. He claims that the machine will remove all joints and warped edges, and will make floors perfectly smooth. It will also remove shellac, varnish, oil, grease stains, &c., in a satisfactory manner. Type A also offered is a 4-hp. self-propelling machine, 22 x 40 in. in size, with two 8 x 18 in. rollers.

The New Idea Floor Hinge.

A floor hinge, for which several points of superiority are claimed, is being offered by the Stover Mfg. Company, Freeport, Ill. It is represented as being noiseless in its action, neat in appearance and easily and quickly applied. The general design of the hinge and its application are shown in the accompanying illustrations.

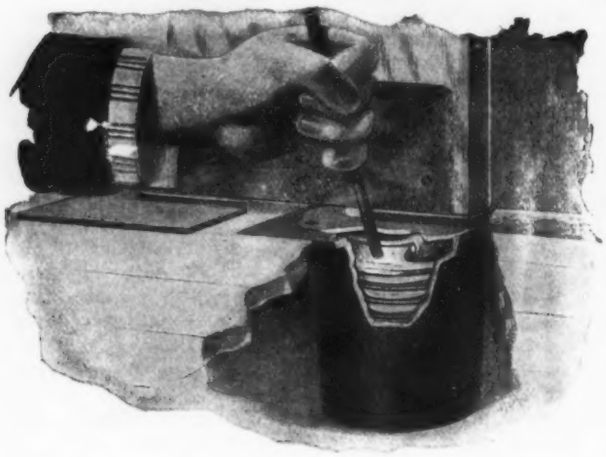


Fig. 1.—New Idea Floor Hinge.

Fig. 1 shows the manner of adjustment, which may be made without removing either hinge or door. With the aid of a loading pin the tension of the spring can be increased or diminished by changing the small pin for-

Fig. 2.—Spring with Mechanism of Floor Hinge.

ward or backward a hole or two. The spring coils are made of large diameter in order to insure a degree of durability that cannot be realized in springs of small

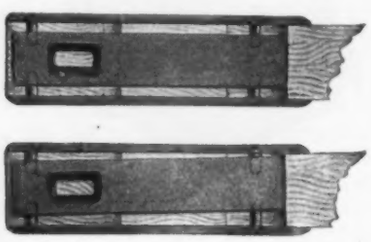


Fig. 3.—Examples of Perfect and Imperfect Alignment of Swivel Plates.

diameter. The entire spring, with its mechanism, shown in Fig. 2, may be lifted out of the cup without disturbing its tension, and when in position is protected from dirt and moisture by a closely fitting cover plate. Examples of perfect and imperfect alignment of the female swivel plates are shown in Fig. 3. The crooked plate, it is explained, is easily adjusted to proper position by the tightening or loosening of screws in the side plates. Ball bearings at the base of the post carry the full weight of the door, and are so fitted that all side play is avoided. The hinges are adaptable to any style of double acting doors, and may be set in cement or tile floors with molten lead or brimstone.

The Excello Power Washing Machine.

The motor washing machine, shown in the accompanying cuts, is offered by the A. D. Howe Machine Company, Wheeling, W. Va. It is operated by a small water motor placed directly over the center of the tub. Forty pounds water pressure will operate the washer, which is furnished complete ready for work, including motor, tub

Fig. 1.—The Excello Power Washing Machine.

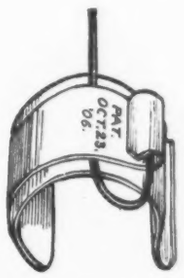
and all hose connections. The inlet hose is connected to the faucet of the city water pipe, and a special connection goes with each machine, so that the inlet hose can be connected with the average faucet, whether threaded or not. The motor, a section cut of which is shown in Fig. 2, is made of high grade brass in all parts that come in contact with the water. It is a single cylinder reciprocating machine, having no center, so as to start at any point when the water is turned on. The

Fig. 2.—Motor of Excello Washing Machine.

cylinder moves back and forth, this arrangement being referred to as exclusive with the Howe Company. Both exhaust and inlet hose are stationary, obviating the wearing of the hose. The motor is alluded to as being economical in the use of water, not a drop being wasted, and it is explained that after passing through the motor the water is as clean as when it comes from the hydrant, and can be used for rinsing or other purposes.

The Judge's Fish Hook Guard.

The detachable guard or clip shown in the accompanying cut is made of the best quality 0.018 spring brass,

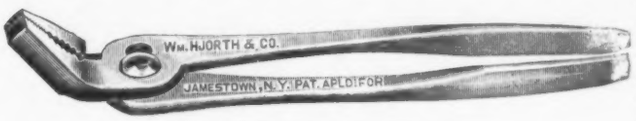


The Judge's Fish Hook Guard.

nickeled to correspond with the trimmings of fishing rods. It fits any fresh water rod, and is easily applied or detached. By its use the hooked end of the line may be securely held and protected from injury or becoming entangled with other lines when the reel and line are temporarily out of use. The retail price of the guard is 25 cents, a liberal discount being made to the trade. The device is offered by the Fish Line Clip Company, Bay State Building, Lawrence, Mass.

Hjorth Bent Nose Plier.

William Hjorth & Co., Jamestown, N. Y., are offering the bent nose plier shown herewith. It has an angle of 45 degrees at the nose, enabling the operator to use it

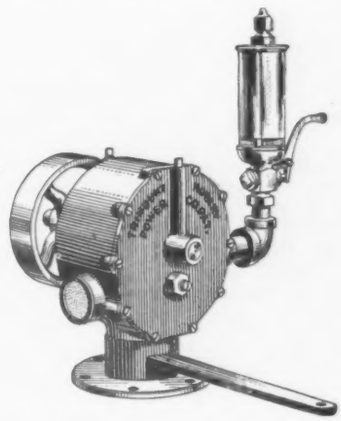


Hjorth Bent Nose Plier.

where it is impossible to use a straight nose plier, and is especially adapted to the use of electricians. The tool is made from drop forged high grade tool steel, nicely fitted, and properly tempered and warranted free from defects. The plier is made in 10-in. size only, both black and nickel plated, and packed one-sixth dozen in a box.

Trimount Motor Boat Whistle.

A. S. Morss Company, Boston, Mass., is offering the new style of whistle for motor boats shown in the accompanying cut. It is a rotary blower driven by friction contact with the flywheel of the engine. The tone of the whistle is said to be unusually loud and clear, and with the action described the whistle will of course blow as long as the valve is pulled without any diminution in tone. It is explained that this form of whistle necessitates keeping no dangerous gases under pressure, and that there are no delicate parts, tanks or gauges. Whistle and pull may be located in any part of the boat. The



Trimount Motor Boat Whistle.

outfit is made entirely of bronze, and is offered in two styles, No. 1 weighing 17 lb., with 1½-in. drain whistle, and No. 2 weighing 33 lb., with 2-in. drain whistle.

The W. P. Lewis Hardware Company, Incorporated, Roswell, N. M., has just completed one of the largest and best appointed exclusively retail Hardware establishments in the country. The retail salesroom is 75 x 198 ft.; cutting, threading and fitting room, 40 x 74 ft.; tin and plumbing shop, 50 x 74 ft.; pipe and casing room, 12 x 200 ft., and warehouse, 50 x 200 ft., double decked throughout, giving 20,000 ft. of storage space. No expense has been spared to provide the best in the way of fixtures and furnishings.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—

	℔ gal.
Linseed, City, raw	42 @43
City, Boiled	43 @44
State and Western, raw	40 @41
Raw Calcutta, in bbls.	@70
Lard, Extra Prime, Winter	77 @78
Extra No. 1	56 @58
No. 1	50 @54
Cotton-seed, Crude, f.o.b. mills	35 @36
Summer Yellow, Prime	46 @46½
Summer White	50½@51
Yellow Winter	50½@51
Sperm, Crude	59 @60
Natural Winter	72 @73
Bleached Winter	75 @76
Bleached Winter, Extra	@..
Tallow, Prime	61 @62
Whale, Crude	35 @36
Natural Winter	46 @47
Bleached Winter	48 @49
Extra Bleached Winter	50 @51
Menhaden, Brown, Strained	32 @33
Light Strained	32 @33
Northern	@..
Southern	@..
Cocoanut, Ceylon	℔ lb 9½@ 9¾
Cochin	℔ lb 10⅜@10¾
Cod, Domestic, Prime	37 @38
Newfoundland	40 @42
Red, Elaine	47 @50
Saponified	℔ lb 6⅞@ 7
Olive, Italian, bbls., Yellow	85 @90
Neatsfoot, Prime	56 @57
Palm, Logos	℔ lb 7 @ 7¼

Mineral Oils—

Black, 29 gravity, 25@30 cold test	℔ gal. 11½@12
29 gravity, 15 cold test	12½@13½
Summer	11½@12
Cylinder, light filtered	19 @20
Dark, filtered	16½@17½
Paraffine, 903-907 gravity	14 @14½
903 gravity	13 @13½
883 gravity	10¾@11¼
Red	13 @14½

Miscellaneous—

Barytes:	
White, Foreign	℔ ton $18.50@20.50
Amer. floated	℔ ton 19.00@20.00
Off color	℔ ton 13.00@16.50
Chalk, in bulk	℔ ton 3.00@ 3.25
In bbls.	℔ 100 lb .@ .35
China Clay, Imported	℔ ton 11.00@17.50
Cobalt, Oxide	℔ 100 lb 2.50@ 2.60
Whiting, Commercial	℔ 100 lb .43@ .52
Gilders	℔ 100 lb .55@ .65
Ex. Gilders	℔ 100 lb .60@ .65

Putty, Commercial—℔ 100 lb

In bladders	$1.70 @1.85
In bbls. or tubs	1.20 @1.45
In 1 lb to 5 lb cans	2.65 @2.95
In 12½ to 50 lb cans	1.50 @1.90

Spirits Turpentine—℔ gal.

In Oil bbls.	69½@70
In machine bbls.	70 @70½

Glue—

	℔ lb
Cabinet	12 @15
Common Bone	7½@ 9
Extra White	18 @24
Foot Stock, White	12 @14
Foot Stock, Brown	9 @11
German Hide	12 @18
French	10 @40
Irish	13 @16
Low Grade	10 @12
Medium White	14 @17

Gum Shellac—

	℔ lb
Bleached, Commercial	46 @48
Bone, Dried	57 @..
Button	10 @50
Diamond I	60 @61
Fine Orange	52 @57
A. C. Garnet	46 @47
Kala Button	35 @36
D. C.	63 @64
Octagon B	56 @57
T. N.	48 @49
V. S. O.	60 @61

Colors in Oil—

	℔ lb
Black, Lampblack	12 @14
Blue, Chinese	36 @46
Blue, Prussian	32 @36
Blue, Ultramarine	13 @16
Brown, Vandyke	11 @14
Green, Chrome	12 @16
Green, Paris	@24
Sienna, Raw	12 @15
Sienna, Burnt	12 @15
Umber, Raw	11 @14
Umber, Burnt	11 @14

White Lead, Zinc, &c.—

	℔ lb
Lead, English white, in Oil	9⅝@10
Lead, American White:	
Lots of 500 lb or over, in Oil	@ 7½
Lots less than 500 lb, in Oil	@ 8
Lead, White, in oil, 25 lb tin pails, add to keg price	@ ⅛
Lead, White, in oil, 12½ lb tin pails, add to keg price	@ 1
Lead, White, in oil, 1 to 5 lb assted tins, add to keg price	@ 1½

Lead, American, Terms: For lots 12 tons and over ¼¢ rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice, for lots of less than 500 lbs. net.

	℔ lb
Zinc, American, dry	5⅝@ 5½
Zinc, French:	
Antwerp, Red Seal, dry	8¾
Antwerp, Green Seal, dry	10¾
Paris, Red Seal, dry	9¼
Paris Green Seal, dry	11

Zinc, V. M. French, in Poppy Oil:
Green Seal:
Lots of 1 ton and over 13¼@13¾
Lots of less than 1 ton 13¾@13⅞
Zinc, V. M. French, in Poppy Oil:
Red Seal:
Lots of 1 ton and over 11⅞@12¾
Lots of less than 1 ton 12¼@12¾
Discounts.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or mixed grades, 1%; 25 bbls., 2%; 50 bbls., 4%.

Dry Colors—

	℔ lb
Black, Carbon	6¼@10
Black Drop, American	3½@ 8
Black Drop, English	5 @15
Black, Ivory	16 @20
Lamp, Com	4 @ 6
Blue, Celestial	4 @ 6
Blue, Chinese	31 @33
Blue, Prussian	29 @32
Blue, Ultramarine	4½@15
Brown, Spanish	½@ 1
Carmine, No. 40	$3.10@3.25
Green, Chrome, ordinary	3½@ 7
Green, Chrome, pure	17 @25
Lead, Red, bbls., ½ bbls., kegs	@ 7¾
Litharge, bbls., ½ bls., kegs	@ 7¾
Ocher, American	℔ ton $8.50@16.00
American Golden	2½@ 3¼
French	1¾@ 2
Foreign Golden	3 @ 4
Orange Mineral, English	10 @12
French	10¾@12
German	8½@10
American	8¾@ 9
Red, Indian, English	4½@ 6
American	3 @ 3¼
Red, Turkey, English	4 @10
Red, Tuscan, English	7 @10
Red, Venetian, Amer.	℔ 100 lb $0.50@1.25
English	100 ℔ $1.15@1.75
Sienna, Italian, Burnt and Powdered	3 @ 6
Italian, Raw, Powdered	3 @ 7
American, Raw	1¾@ 2
American Burnt and Pow'd	1¾@ 2
Talc, French	℔ ton $18.00@25.00
American	℔ ton 15.00@25.00
Terra Alba, French	℔ 100 lb .90@ 1.00
English	℔ 100 lb .80@ 1.00
American	℔ 100 lb, No. 1 .75@ .80
American	℔ 100 lb, No. 2 .60@ .65
Umber, Turk. Brt & Pow	2 @ 3½
Turkey, Raw and Powdered	2¼@ 3½
Burnt, American	1¾@ 2
Raw, American	1¾@ 2
Yellow Chrome	12 @14
Vermilion, American Lead	7 @25
Quicksilver, bulk	65 @..
Quicksilver, bags	@66
English, Imported	65 @70
Chinese	$0.90@1.00

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1906, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—
Domestic, ₱ doz. $3.00.....33⅓%
North's 10%
Zimmerman's—See Fasteners, Blind.

Window Stop—
Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition— See *Caps, Cartridges, Shells, &c.*

Anti-Rattlers—
Fernald Mfg. Co. Burton Anti-Rattlers, ₱ doz. pairs, Nos. 1, $0.75; 2, $0.60; 4, $1.00; 5, $0.50.
Fernald Quick Shifter, ₱ doz. pairs .....$2.00@$3.00

Anvils—American—
Eagle Anvils.....₱ lb @8½¢
Hay-Budden, Wrought.....9½@9¾¢
Trenton .....₱ lb 9½@9¾¢

Imported—
Peter Wright & Sons, ₱ lb, 24 to 349 lb, 11¢; 350 to 600 lb, 11½¢.

Anvil, Vise and Drill—
Millers Falls Co., $18.00.....15&10%

Apple Parers— See *Parers, Apple, &c.*

Aprons, Blacksmiths'—
Livingston Nail Co.....33⅓%

Augers and Bits—
Com. Double Spur..70&5@70&10%
Jennings' Pat., reg. finish....60&5@60&10%
Black Lip or Blued...65@65&5%
Boring Mach. Augers.....70%
Car Bits, 12-in. twist.....40&10%
Ford's Auger and Car Bits.....40&5%
Ft. Washington Auger Co., Conard's 35%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list..25%
No. 30, R. Jennings' list.....40&7½%
Russell Jennings'.....25&10&2½%
L'Hommedieu Car Bits.....15%
Mayhew's Countersink Bits.....45%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist.....60%
Snell's King Auger Bits.....50%
Wright's Jennings' Bits.....50%

Bit Stock Drills—
See *Drills, Twist.*

Expansive Bits—
Clark's small, $18; large, $26....50&10%
Clark's Pattern, No. 1, ₱ doz. $26; No. 2, $18.....60&10&10%
Ford's, Clark's Pattern.....60%
C. E. Jennings & Co., Steer's Pat..25%
Lavigne Pat., small size, $18.00; large size, $26.00.....60&10&10%
Swan's 60%

Gimlet Bits—
Per gro.
Common Dble. Cut....$3.00@3.25
German Pattern, Nos. 1 to 10, $4.75; 11 to 13, $5.75

Hollow Augers—
Bonney Pat., per doz..$5.50@6.00
Ames .....25&10%
Universal 20%
Wood's Universal.....25%

Ship Augers and Bits—
Ship Augers.....40&10%
Ford's .....33⅓&5%
C. E. Jennings & Co.:
L'Hommedieu's 15%
Watrous' .....33⅓&7½%
Snell's 40%

Awl Hafts— See *Handles, Mechanics' Tool.*

Awls—
Brad Awls:
Handled .....gro. $2.75@3.00
Unhdled, Shldered...gro.63@66¢
Unhandled, Patent..gro.66@70¢
Peg Awls:
Unhandled, Patent..gro. 31@34¢
Unhdled, Shldered..gro. 65@70¢
Scratch Awls:
Handled, Com...gro. $3.50@4.00
Handled, Socket..gro.$11.50@12.00

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—
Single Bit, base weights: Per doz.
First Quality.....$4.75@5.00
Second Quality.....$4.25@4.50
Double Bit, base weights:
First Quality.....$7.00@7.50
Second Quality.....$6.50@6.75

Axle Grease—
See *Grease, Axle*

Axles— *Iron or Steel*
Concord, Loose Collar..4½@5¢
Concord, Solid Collar..4¾@5¼¢
No. 1 Common, Loose..5½@4¢
No. 1¼ Com., New Styles3¾@4¼¢
No. 2 Solid Collar.....3¾@4¼¢
Half Patent:
Nos. 7, 8, 11 and 12....70@75%
Nos. 13 to 14.....70@75%
Nos. 15 to 18.....75@75&5%
Nos. 20 to 22.....75@75&5%

Boxes, Axle—
Common and Concord, not turned lb., 4½@5¢
Common and Concord, turned. lb., 5½@6¢
Half Patent.....lb., 9½@10¢

Bait— Fishing—
Hendryx:
A Bait.....20%
B Bait.....25%
Competitor Bait.....20&5%

Balances— Sash—
Caldwell new list.....50%
Fuhrman .....50&10@60%

Spring—
Spring Balances.....50&10@60%
Chatillon's:
Light Spg. Balances.....50@50&10%
Straight Balances.....40@40&10%
Circular Balances.....50&10%
Large Dial.....30%

Barb Wire—See *Wire, Barb.*

Bars— Crow—
Steel Crowbars, 10 to 40 lb.... per lb., 2¾@3¢

Towel
No. 10 Ideal, Nickel Plate..₱ gro. $8.50

Beams, Scale—
Scale Beams.....40%
Chattillon's No. 1.....30%
Chattillon's No. 2.....40%

Beaters, Carpet—
Holt-Lyon Co.:
No. 12 Wire Coppered ₱ doz. $0.80; Tinned $0.85
No. 11 Wire Coppered ₱ doz. $1.15; Tinned $1.20
No. 10 Wire Tinned.....₱ doz. $1.50
Western W. G. Co.:
No. 1 Electric.....₱ gro. $7.80
No. 2 Buffalo.....₱ gro. $9.00
No. 3 Perfection Dust.....₱ gro. $8.00

Egg—
Holt-Lyon Co.:
Holt, per doz., No. 5, Jap'd, $0.80; No. A, Jap'd, $1.15; No. B, Jap'd, $1.85; No. 6, Jap'd, $1.65.
Lyon, Jap'd, per doz., No. 2, $1.35.
Taplin Mfg. Co.:
Improved Dover, per gro., No. 60, $6.00; No. 75, $6.50; No. 100, $7.00; No. 102, Tin'd, $8.50; No. 150, Hotel, $15.00; No. 152, Hotel Tin'd, $17.00; No. 200, Tumbler, $8.50; No. 202, Tumbler Tin'd, $9.50; No. 300, Mammoth, per doz., $25.00.
Turner & Seymour Mfg. Co.:
T. & S. Dover.....$6.00
Western, W. G. Co., ₱ gro., Buffalo, No. 2, $8.00; Perfection, No. 3, $9.00.
Wonder (R. M. Co.)..₱ gro. net, $6.25

Bellows—
Blacksmith, Standard List..
Split Leather.....65%
Grain Leather.....60%

Hand—
Inch..	*6*	*7*	*8*	*9*	*10*	Net Prices.
Doz...	*$5.50*	*6.15*	*6.60*	*7.15*	*7.70*	

Molders—
Inch..	*9*	*10*	*11*	*12*	*14*	Net Prices.
Doz...	*$8.00*	*9.00*	*10.50*	*12.50*	*14.50*	

Bells— Cow—
Ordinary Goods..75&5@75&10&5%
High grade.....70&10@75%
Jersey .....75&10%
Texas Star.....50%

Door—
Abbe's Gong.....40@40&10%
Barton Gong.....50%
Home R. & E. Mfg. Co.'s.....55&10%
Trip Gong.....50@50&10%
Yankee Gong.....40&10@50%

Hand—
Polished, Brass.....50@50&10%
White Metal.....50@50&5%
Nickel Plated.....40&10@50%
Swiss .....50&10@50&10&5%
Cone's Globe Hand Bells.....33⅓@35%
Silver Chime.....25@30%

Miscellaneous—
Farm Bells.....lb., 2¼@2½¢
Church and School.....60%
Table Call Bells.....50@50&10%

Belting— Leather—
Extra Heavy, Short Lap..60&5%
Regular Short Lap....60&10&5%
Standard 70%
Light Standard.....70&5%
Cut Leather Lacing.....45%
Leather Lacing Sides, per sq. ft. 25¢

Rubber—
Agricultural (Low Grade).... 75@75&5%
Common Standard....70@70&10%
Standard .....60&5@60&10%
Extra .....60@60&5%
High Grade.....50&5@50&10%

Bench Stops—
See *Stops, Bench*

Benders and Upsetters, Tire—
Detroit Perfected Tire Bender.....40%
Detroit Stoddard's Lightning Tire Upsetters, No. 1, $4.25; No. 2, $7.25; No. 3, $10.50; No. 4, $16.25; No. 5, $20.50.
Green River Tire Benders and Upsetters 20%

Bicycle Goods—
John S. Leng's Son & Co.'s 1907 list:
Chain, Parts, Spokes.....50%
Tubes 60%

Bits—
Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks— Tackle—
Common Wooden.....75%
Hartz St. Tackle Blocks.....50@50&5%
B. & L. B. Co.:
Boston Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50&10%; Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Steel, 50&10%; Wire Rope Snatch, 50%.
Lane's Patent Automatic Lock and Junior 30%
Stowell's Novelty, Mal. Iron.....50%
Stowell's Loading.....50&10%
See also Machines, Hoisting.

Boards, Stove—
Paper and Wood Lined.....40%
Embossed 50%

Boards, Wash—
See *Washboards.*

Bobs, Plumb—
Keuffel & Esser Co.....33⅓%

Bolts—

Carriage, Machine, &c.—
Common Carriage (cut thread): ⅜ × 6 and smaller..70&12½@—%
Larger and Longer..60&2½@—%
Phila: Eagle $3.00 list May 24, '99 40%
Bolt Ends.....65@65&5%
Machine, ⅜ x 4 and smaller.. 70&12½@—%
Machine, larger and longer.. 60&7½@—%

Door and Shutter—
Cast Iron Barrel, Japanned, Round Brass Knob:
Inch.....	*3*	*4*	*5*	*6*	*8*
Per doz..$1.30	*.35*	*.45*	*.60*	*.80*	

Cast Iron Spring Foot, Jap'd:
Inch.....	*6*	*8*	*10*
Per doz.....$1.20	*1.50*	*2.25*	

Cast Iron Chain, Flat, Japanned:
Inch.....	*6*	*8*	*10*
Per doz.....$1.00	*1.40*	*1.65*	

Cast Iron Flat Shutter, Jap'd, Brass Knobs:
Inch.....	*6*	*8*	*10*
Per doz.....$0.75	*.95*	*1.25*	

Wrought Barrel Japd..80@80&10%
Barrel Bronzed.....60&10%
Spring .....70&10@70&10&10%
Shutter .....50&5@50&10&5%
Square Neck.....75@75&10%
Square .....70&10&10%
Ives' Patent Door.....50%

Plow and Stove—
Plow .....65&10@—%
Stove .....85@85&10%

Tire—
Common Iron.....80%
Norway Iron.....80%
American Screw Company:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Bay State, list Dec. 28, '99.....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84....82½%
Eclipse, list Dec. 28, '99.....80%
Mount Carmel Bolt Co.:
Norway Phila., list Oct. 16, '84....80%
Eagle Phila., list Oct. 16, '84....82½%
Mount Carmel, list Dec. 28, '99...80%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....80%
Norway Phila., list Oct., '84.....80%
Shelton Co.:
Tiger Brand, list Dec. 28, '99.....80%
Phila., Eagle, list Oct. 16,1884..82½%
Union Nut Co.:
Tire Bolts.....72½%

Borers, Tap—
Borers Tap, Ring, with Handle:
Inch.....	*1¼*	*1½*	*1¾*	*2*
Per doz...$4.80	*5.60*	*6.40*	*8.00*	
Inch	*2¼*	*2½*		
Per doz.....	*$8.65*	*11.50*		

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.75; No. 3, $2.50 each.....25%

Boxes, Mitre—
C. E. Jennings & Co.....30%
Langdon, New Langdon and Langdon Improved, 20&10%; Langdon Acme .....15&10%
Perfection 40%
Seavey 40%
Stanley R. & L. Co.: Nos. 210 to 460, 30%; Nos. 50 and 60.....35%

Braces—
Common Ball, American..$1.25@1.30
Barber's .....50&10&10@60&10%
Fray's Genuine Spofford's.....60%
Fray's No. 70 to 120, 81 to 123, 207 to 414 .....60%
C. E. Jennings & Co.....50&5%
Mayhew's Ratchet.....60%
Mayhew's Quick Action Hay Pat...50%
Millers Falls Drill Braces.....25&10%
P., S. & W. Co., Peck's Pat.60@60&5%
Stanley R. & L. Co.:
Stanley, 35%; Victor.....45%

Brackets—
Wrought Steel.....70&10@75&10%
Griffin's Pressed Steel..75&10@75&10&5%
Griffin's Folding Brackets.....70&10%
Stowell's Cast Shelf, 75%; Sink...50%
Western, W. G. Co., Wire.....60&10%

Bright Wire Goods—
See *Wire and Wire Goods.*

Broilers—
Kilbourne Mfg. Co.....75&20%
Western, W. G. Co.....80%
Wire Goods Co.....75@75&10%

Buckets, Galvanized—
M'f'gr's list, price per gross.
Quart..	*10*	*12*	*14*	65&10%
Water, Reg...	*25.35*	*28.00*	*32.00*	
Water, Hvy...	*45.35*	*48.00*	*52.00*	
Fire, Rd. Btm.	*32.00*	*34.65*	*38.65*	
Well	*37.35*	*41.35*	*45.35*	

Bucks, Saw—
Hoosier.....₱ gro. $36.00

Bull Rings—See *Rings, Bull*

Butts— Brass—
Wrought, High List, Oct. 26, '06. 45@45&10%
Cast Brass, Tiebout's.....40%

Cast Iron—
Fast Joint, Broad....40&10@50%
Fast Joint, Narrow...40&10@50%
Loose Joint.....70&10@75%
Loose Pin.....70&10@75%
Mayer's Hinges.....70@70&5
Parliament Butts.....70@70&5

Wrought Steel—
Discount
Reversible and Broad.....70&5%
Light Reversible, Light Narrow .....70&5%
Loose Joint, Narrow, Light Inside Blind, etc.....70%
Back Flaps, Table Chest....65%

Cages, Bird—
Hendryx Brass: Series 5000, 5000, 1100, 10%; 1200, 25%; 200, 300, 600, 900 .....40%

Hendryx Bronze; Series 700, 800..10%
Hendryx Enameled.....40%

Calipers—See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong, per lb., 4¼@4¾¢
Sharp, 1 prong, per lb., 4¾@5¼¢
Burse's Blunt, 4¼@4¾¢; Sharp, 4¾@5¼¢
Gautier, Blunt, 4@4¼¢; Sharp, 4½@4¾¢
Perkins', Blunt, ℔ lb, 3.65¢; Sharp, 4.15¢

Can Openers—

See *Openers, Can.*

Cans, Milk—

	5	8	10 gal.
Illinois Pattern	$1.35	1.85	2.05 each.
New York Pattern	1.59	2.20	2.45 each.
Baltimore Pattern	1.50	2.20	2.45 each.
Dubuque	1.35	1.60	1.75 each.

Cans, Oil—

Buffalo Family Oil Cans:

3	5	10 gal.
$18.00	60.00	129.60 gro., net.

Caps, Percussion—

Eley's E. B.....50@55¢
G. D.....*per M* 34@35¢
F. L.....*per M* 40@42¢
G. E.....*per M* 48@50¢
Musket.....*per M* 62@63¢

Primers—

Berdan Primers, 32 per M..20@5%
Primer Shells and Bullets..15&10%
All other primers per M.$1.52@1.60

Cartridges—

Blank Cartridges:
32 C. F., $5.50.....10@5%
38 C. F., $7.00.....10@5%
22 cal. Rim, $1.50.....10@5%
32 cal. Rim, $2.75.....10@5%
B. B. Caps, Con. Ball, Smegd.$1.90
B. B. Caps, Round Ball....$1.40
Central Fire.....25%
Target and Sporting Rifle..15@5%
Primed Shells and Bullets.15&10%
Rim Fire, Sporting.....50%
Rim Fire, Military.....15@5%

Casters—

Bed.....65&10%
Plate.....60@5%
Philadelphia.....70&10%
Acme, Ball Bearing.....33⅓%
Boss.....70&10%
Boss Anti-Friction.....70&10%
Gem (Roller Bearing).....80%
Martin's Patent (Phoenix).....45%
Standard Ball Bearing.....45%
Tucker's Patent low list.....30%
Yale (Double Wheel) low list.....50%

Cattle Leaders—

See *Leaders, Cattle.*

Chain, Proof Coil—

American Coil, Straight Link:

3-16	¼	5-16	⅜	7-16	½	9-16
$8.77	6.17	5.02	4.57	4.37	4.27	4.22

⅝ ¾ ⅞ to 1 1⅛ to 1¼ inch.
$4.17 4.07 4.02 4.12

In cask lots, deduct 25¢.
German Coil.....60&10&10@70%

Halter—

Halter Chains.....60@60@5%
German Pattern Halter Chains, list July 24, '97.....60@10@5%
Covert Mfg. Co.
Halter.....35&5%

Cow Ties—

See *Halters and Ties.*

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6½—6-3, Straight, with ring.$28.00
6½—6-2, Straight, with ring.$29.00
6½—8-2, Straight, with ring.$32.00
6½—10-2, Str'ght, with ring.$37.00

NOTE.—Add 2c per pair for Hooks. Twist Traces; add per pair for Nos. 2 and 3, 2c; No. 1, 3c; No. 0, 4c to price of Straight Link.

Eastern Standard Traces, Wagon Chain, &c.....60%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron.....60&10%
Brass.....50&10%
Safety and Plumbers' Chain, 60&10%
Gal. Pump Chain.....*lb*.4@4½%
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stallion.....40%
Oneida Community:
American Halter, Dog and Kennel Chains.....35&2½@40%
Niagara Dog Leads and Kennel Chains.....45@50&5%
Wire Goods Co.:
Dog Chain.....70&10%
Universal Dbl.-Jointed Chain.....50%

Chain and Ribbon, Sash—

Oneida Community:
Steel Chain..... 60%
Pullman:
Bronze Chain, 60%; Steel Chain, 60&10%
Sash Chain Attachments, per set..8¢
Aluminoy Sash Ribbon, per 100 ft.....$1.25@$3.00
Sash Ribbon Attachments, per set.8¢

Chalk—(From Jobbers.)

Carpenters' Blue....*gro.*, 50@55¢
Carpenters' Red.....*gro.*, 45@50¢
Carpenters' White...*gro.*, 40@45¢

Checks, Door—

Bardsley's.....45%
Pullman, per gro.....$54.00
Russwin.....33⅓%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools.....55%
Youths' Chests, with Tools.....10%
Gentlemen's Chests, with Tools..30%
Farmers', Carpenters,' etc., Chests, with Tools.....21%
Machinists' and Pipe Fitters' Chests, Empty.....50%
Tool Cabinets.....50%
C. E. Jennings & Co.'s Machinists' Tool Chests.....33⅓&10%

Chisels—

Socket Framing and Firmer
Standard List.....70&10@75%
Buck Bros.....30
Charles Buck Edge Tool Co.....30%
C. E. Jennings & Co.:
Socket Firmer No. 10.....60%
Socket Framing No. 15.....60%
Swan's.....66⅔@70%
L. & I. J. White Co.....30@30&5%

Tanged—
Tanged Firmers.....30&5@35%
Buck Bros.....30
Charles Buck Edge Tool Co.....30%
C. E. Jennings & Co. Nos. 191, 181..25%
L. & I. J. White Co.....25&5%

Cold— *lb.*
Cold Chisels, good quality..13@15¢
Cold Chisels, fair quality..11@12¢
Cold Chisels, ordinary... 9@10¢

Chucks—

Almond Drill Chucks.....35%
Almond Turret Six-Tool Chuck.....40%
Beach Pat., each $8.00.....35&5%
Empire.....25
Blacksmiths'.....25%
Jacobs' Drill Chucks.....35%
Pratt's Positive Drive.....25%
Skinner Patent Chucks:
Independent Lathe Chucks.....40%
Universal, Reversible Jaws.....40%
Combination, Reversible Jaws.....40%
Drill Chucks, New Model, 25%; Standard, 40&10%; Skinner Pat., 25%; Positive Drive.....40%
Planer Chucks.....30%
Face Plate Jaws.....40%
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 17, 40%; No. 21.....35%
Scroll Combination, Nos. 82 and 84.....30%
Geared Scroll, Nos. 33, 34 and 35..30%
Independent Iron, Nos. 18 and 318..35%
Independent Steel, No. 64.....25%
Union Drill, Nos. 000, 00, 100, 101, 102, 103, 104.....35%
Union Czar Drill.....25%
Universal 11, 12, 16, 17, 13, 14, 15..35%
Universal, No. 42.....30%
Iron Face Plate Jaws, Nos. 28, 30, 48 and 50.....35%
Steel Face Plate Jaws, Nos. 70 and 72.....30%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill..50%
Little Giant Drill, Improved.....50%
Oneida Drill.....50%
Scroll Combination Lathe.....50%

Clamps—

Adjustable, Hammers'.....20@20&5%
Carriage Makers', P., S. & W. Co.....40&10@50%
Besly, Parallel.....33⅓&10%
Lineman's, Utica Drop Forge & Tool Co.....40%
Wood Workers, Hammers'.....40&10%
Saw Clamps, see Vises, Saw Filers'.

Cleaners, Drain—

Iwan's Champion, Adjustable.....55%
Iwan's Champion, Stationary.....45%

Sidewalk—

Star Socket, All Steel..℔ doz. $4.05 net
Star Shank, All Steel..℔ doz. $3.24 net
W. & C. Shank, All Steel, ℔ doz., 7½ in., $3.00; 8 in., $3.25.

Cleavers, Butchers'—

Foster Bros.....30%
Fayette R. Plumb.....30%
L. & I. J. White Co.....30%

Clippers, Horse and Sheep—

Chicago Flexible Shaft Company:
1902 Chicago Horse, each..$10.75
20th Century Horse, each..$5.00
Lightning Belt Horse, each.$15.00
Chicago Belt Horse, each.$20.00
Stewart's Enclosed Gear Horse, each.....$6.75
Stewart's Patent Sheep Shearing Machine, each.....$12.75
Stewart Enclosed Gear Shearing Machine, No. 8, each..$9.75

Clips, Axle—

Regular Styles, list July 1, '05.80%

Cloth and Netting, Wire—See *Wire, &c.*

Cocks, Brass—

Hardware list:
Plain Bibbs, Globe, Kerosene, Racking, Liquor, Bottling, &c.....60&10@65%
Compression Bibbs...55&10@60%

Coffee Mills—

See *Mills, Coffee.*

Collars, Dog—

Nickel Chain, Walter B. Stevens & Son's list.....40%
Leather, Walter B. Stevens & Son's list.....40%

Combs, Curry—

Metal Stamping Co.....40%

Compasses, Dividers, &c.

Ordinary Goods.....70&10@75%
Wm. Schollhorn Co.:
Excelsior Dividers.....55%
Lodi Dividers.....75%

Conductor Pipe,—

L. C. L. to Dealers:

	Galvanized		
	Galv. Steel.	*Charcoal Iron.*	*Copper. 14, 16&20 oz.*
Eastern:			
	70%	50&17½%	30%
Central:			
	65&10%	55&2½%	20&10%
Western and Southern:			
	65&5%	50&7½%	20&7½%
So. Western			
	50&25&2½%	50%	20&5%

Terms, 60 days; 2% cash 10 days. Factory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—

Gal.	each.. 2	3	4	6	8
Labrador	$1.20	$1.50	$1.80	$2.10	$2.70
Gal.	3	4	6	8	
Iceland, ea.	$1.80	$2.10	$2.40	$3.00	
Gal.	2	3	4	6	8
Galvanized, ea.	$1.85	$2.00	$2.25	$2.90	$3.90

Galvanized, Lined, side handles,

Gal.	2	3	4	6	8
Each	$1.95	$2.15	$2.40	$3.30	$4.15

White Enameled, 25%; Agate Lined, 25%

Coopers' Tools—

See *Tools, Coopers'.*

Coppers' Soldering—

Soldering Coppers, 3 lbs. to pair and heavier, 32@35¢; lighter than 3 lb. to pair.....34@37¢

Cord—Sash—

Braided, Drab.....*lb.* 35¢
Braided, White, Com., Nos. 8 to 12, 26¢; No. 7, 26½¢; No. 6, 27½¢.
Cable Laid Italian, lb., No. 18..37¢
Italian, lb., A, No. 18, 25¢; B, 22¢
Common India.....*lb.*, 11@11½¢
Cotton Sash Cord, Tw'ted.18@20¢
Patent Russia.....*lb*...20¢
Cable Laid Russia.....*lb*...21¢
India Hemp, Br'd'd.....*lb*...21¢
India Hemp, Twisted..*lb*.13@14¢
Patent India, Twisted...*lb*...17¢
Anniston Cordage Co.: ℔ lb, solid Braided, Nos. 8 to 12, $0.24; No. 7, $0.24½; No. 6, $0.25½; ℔ doz., 50 ft.: Oriole, $2.00; 50 ft., Columbia, $0.85; 50 ft., Victors, $1.00; 50 ft., 6-Thread, $1.10; 60 ft., 3-Thread, $0.95; 50 ft., Manila, $1.40; 60 ft., Jute, $0.75.
Pearl Braided, cotton, No. 6, ℔ lb, 27½¢; No. 7, 26½¢; Nos. 8 to 12, 26¢
Eddystone, Braided, Nos. 8 to 12, 26¢; 7, 26½¢; 6, 27½¢.
Harmony Cable Laid Italian, Nos. 7 to 10.....℔ lb 23 ¢
Pullman:
Wire Sash Cord.....18%
Sash Cord Attachments, per doz.10¢
Samson, Nos. 8 to 12:
Braided, ℔ lb., Drab Cotton, 55¢; Italian Hemp, 40¢@50¢; Linen, 65¢; White Cotton, 50¢; Spot Cord.....50¢ } 15%
Massachusetts, White....℔ lb 40¢
Massachusetts, Drab....℔ lb 45¢
Phoenix, White, Nos. 8 to 12, 27¢;
Silver Lake, per lb.:
A, Drab, 45¢; A, White, 40¢; B, Drab, 40¢; B, White, 35¢; Italian Hemp, 40¢; Linen....57½¢
See also Chain and Ribbon.

Wire, Picture—

List July 19, 1906...85&10&10@—
Hendryx Standard Wire Picture Cord, old list, 85&10%
Turner & Stanton Co, Wire Picture Cord.....90%

Cradles—

Grain.....40&12½%

Crayons—

White Round Crayons, Cases, 100 gro., $6.50@$7.50 at factory, but lower prices made by jobbers
Zelnicker's Lumber, ℔ gro.
White and Purple, Indelible....$7.50
Blue, Red, Green, Yellow and Terra Cotta, $6.50; Black.....$4.00
Giant Lumber, 5¼ in. x 15-16 in. round, all colors, $16.25; Indelibles.....$18.75
Genuine Soapstone, Metal Workers', 5 in. x ¼ in. Round, $2.50; 5 in. x ¼ in. Square, $1.75; 5 x ½ x 3-16, $2.50; 5 x 1¼ x 3-16.....$3.00

Crooks, Shepherds'—

Fort Madison, per doz., Heavy, $7.00; Light.....$6.50

Crow Bars—See *Bars, Crow.*

Cultivators—

Victor Garden.....50%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1847, ℔ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor.....℔ doz. $3.00
Wm. Rogers & Son.....℔ doz. $2.50

Cutters—Glass—

H. H. Mayhew Co.....40%
Red Devil.....50%
Smith & Hemenway Co.....50%
Woodward.....40%

Meat and Food—

American							
							30%
Nos.	 401	402	403	404	405	406	407
Each	.. $5	$7	$10	$12	$25	$50	$60

Enterprise:

Nos.	 5	10	12	22	32	
Each	.. $2	$3	$2.75	$1.50	$6	25@25&7½%

No. 202, $1.50.....40&7½%

Dixon's					℔ doz.	30@30&5%
Nos.	1	2	3	4		
	$14.00	$17.00	$19.00	$30.00		

Ideal.....40@40&5%
Little Giant.....℔ doz. 40@50%

Nos.	305	310	312	320	322
	$35.00	$48.00	$44.00	$72.00	$68.00

N. E. Food Choppers.....25%
New Triumph No. 605, ℔ doz. $24.00.....40@50%
Russwin Food, No. 1, $24.00; No. 2, $27.00.....45&10&10%
Woodruff's.....℔ doz. 30@30&5%

Nos.		100	150
		$15.00	$18.00

Enterprise Beef Shavers.....25@30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw and Kraut Cutters.....35%
Corn Graters.....30%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife....℔ doz. $3.00
Combined Slaw Cutter and Corn Grater.....℔ doz. $4.00
Tucker & Dorsey Mfg. Co.:
Kraut Cutters.....40%
Slaw Cutters, 1 Knife..℔ gr. $18@$20
Slaw Cutters, 2 Knife..℔ gr. $22@$30

Tobacco—

All Iron, Cheap...*doz. $4.25@$4.50*
Enterprise.....25@30%
National, ℔ doz., No. 1, $21; No. 2, $18.....40%

Diggers, Post Hole, &c.—

Disston's:
Rapid, ℔ doz., $24.00.....25%
Samson, ℔ doz., $34.00.....25%
Iwan's Improved Post Hole Auger.40&5%
Vaughan Pattern Post Hole Augers, ℔ doz., $6.25
Perfection Post Hole Diggers, ℔ doz.....$8.75
Split Handle Post Hole Diggers, ℔ doz., $7.75
Kohler's, ℔ doz., Universal, $14.00; Little Giant, $12.00; Hercules, $10.00; Invincible, $9.00; Rival, $8.00; Pioneer.....$7.00
Never-Break Post Hole Diggers, ℔ doz., $24.00.....60%

Dividers—See *Compasses.*

Drawers, Money—

Tucker's Pat. Alarm Till No. 1, ℔ doz., $18; No. 2, $15; No. 3, $12; No. 4, $18.

Drawing Knives—

See *Knives, Drawing.*

Dressers, Emery Wheel—

Sterling Emery Wheel Dressers.....35%
Sterling Wheel Dresser Cutters.....35%

Drills and Drill Stocks—

Blacksmiths' Common Drilling Machines.....$1.50@$1.75
Breast, Millers Falls.....15&10%
Breast, P., S. & W.....40%
Goodell Automatic Drills.50&10@60&10%
Johnson's Automatic Drills, Nos. 2 and 3.....16⅔%
Johnson's Drill Points.....16⅔%
Millers Falls Automatic Drills.33⅓&10%
Ratchet, Curtis & Curtis.....25%
Ratchet, Parker's.....40%
Ratchet, Weston's.....40%
Ratchet, Weston's, Style H Improved.....40%
Ratchet, No. 012.....40%
Ratchet, Celebrated.....40%
Ratchet, Whitney's, P., S. & W..50%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00.....33⅓%

Twist Drills—

Bit Stock.....60&10&10@70%
Taper and Straight Shank.....60&10@60&10&5%

Drivers, Screw—

Screw D'ver Bits, per doz..45@50¢
Balsey's Screw Holder and Driver, ℔ doz., 2½-in., $6; 4-in., $7.50; 6-in., $9.....50%
Buck Bros.' Screw Driver Bits.....30%
Champion.....50%
Disston's.....70%
Edson.....60%
Fray's Hol. H'dle Sets, No. 3, $12..50%
Ford's Brace Screw Drivers....40&10%
Gay's Double Action Ratchet.....35%
Goodell's Auto.....65@65&10%
Mayhew's Black Handle.....40%
Mayhew's Monarch.....40%
Millers Falls, Nos. 20 and 21...25&10%
Millers Falls, Nos. 11, 12, 41, 42..15&10%
New England Specialty Co.....30%
Smith & Hemenway Co., Neverturn, 40&5%; Elmora.....50%
H. D. Smith & Co.'s Perfect H'dle.40%
Stanley R. & L. Co.'s:
No. 64, Varn. Handles, 60&10%; No. 86, 70%; Defiance, 70%; Hurwood, 55%.
Swan's:
Nos. 7565 to 7568, 50%; No. 7540, 40&10%

Eave Trough, Galvanized—

	Territory. Galv. Steel.	*L. C. L. Galvanized Charcoal Iron.*	*Copper. 14, 16&20 oz.*
Eastern:			
	70&30%	70%	30%
Central:			
	75&10&2½%	65&10%	20&10%
Western and Southern:			
	75&7½%	65%	20&7½%
So. Western:			
	75%	60&10%	20&5%

Terms,—2% for cash. Factory shipments generally delivered.
See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory shipments, all territories:
Galv. Steel and Galv. C. I. Standard Gauge.....80%
No. 26.....30%
No. 24.....25%
No. 22.....10%
Copper.....40&10%

Elbows, Stove Pipe—

Edwards, Standard Blue.....40&10&10%
Edwards, Royal Blue.....40&10&10%
Dover, one piece (R. M. Co.)....40&10%
Perfect Elbows.....40%

Emery, Turkish—

	4 to 46:	*5½ to 220: Flour.*
Kegs.....*lb.*	5 ¢	5½¢ 5¼¢
½ Kegs.....*lb.*	5¼ ¢	5¾¢ 5¾¢
¼ Kegs.....*lb.*	5½¢	6 ¢ 5 ¢
10-lb. cans, 10 in case....6½¢		7 ¢ 6 ¢
10-lb. cans, less than 10.....	10 ¢	10 ¢ 8 ¢
Less quantity..	10 ¢	10 ¢ 9 ¢

NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Extractors, Lemon Juice
—See *Squeezers, Lemon.*

Fasteners, Blind—
Zimmerman's .....50&10%
Walling's .....40&10%

Cord and Weight—
Ives 33⅓%

Faucets—
Cork Lined.....50@50&10%
Metallic Key, Leather Lined..60&10@70%
Red Cedar.....40&10@50%
Petroleum.....70&10@75%
B. & L. B. Co.:
Metal Key.....60&10%
Star 60%
West Lock.....50&10%
John Sommer's Peerless Tin Key....40%
John Sommer's Boss Tin Key.....50%
John Sommer's Victor Mtl. Key.50&10%
John Sommer's Duplex Metal Key..60%
John Sommer's Diamond Lock.....40%
John Sommer's I. X. L. Cork Lined...50%
John Sommer's Reliable Cork Lined...50&10%
John Sommer's Chicago Cork Lined.60%
John Sommer's O. K. Cork Lined...50%
John Sommer's No Brand, Cedar....50%
John Sommer's Perfection, Cedar....40%
McKenna, Brass:
Burglar Proof, N. P.....25%
Improved, ¾ and ⅞ inch.....25%
Self Measuring:
Enterprise, ℔ doz. $36.00.....40&10%
Lane's, ℔ doz. $36.00.....40&10%
National Measuring, ℔ doz. $36.40&10%

Felloe Plates—
See *Plates, Felloe.*

Files— Domestic—
List Nov. 1, 1899.
Best Brands.....70&10@75&10%
Standard Brands.75&10@75&10&10%
Lower Grade....75&10&10@80&10%

Imported—
Stubs' Tapers, Stubs' list, July 24, '97.....33 1-3@40%

Fixtures, Fire Door—
Richards Mfg. Co.:
Universal, No. 103; Special, No. 104.....$3.75
Fusible Links, No. 96.....50%
Expansion Bolts, No. 107.....60&10%

Grindstone—
Net Prices:

Inch	15	17	19	21
Per doz.	$3.25	3.75	4.25	4.75

P., S. & W. Co.....30&10%
Reading Hardware Co.....60%
Stowell's Giant Grindstone Hanger.. ℔ doz. $6.00
Stowell's Grindstone Fixtures, Extra Heavy, 40&10%; Light.....50%

Fodder Squeezers—
See *Compressors.*

Forks—
NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.
Iowa Dig-Ezy Potato.....60&10%
Victor, Hay.....60&15&2½%
Victor, Manure.....60%
Victor, Header.....60%
Champion, Hay.....60%
Champion, Header.....60%
Champion, Manure.....60&15&2½%
Columbia, Hay.....60&20%
Columbia, Manure.....70%
Columbia, Spading.....70&12½%
Hawkeye Wood Barley.....40%
W. & C. Potato Digger.....60&10%
Acme Hay.....60&20%
Acme Manure, 4 tine.....60&10&5%
Dakota Header.....60&20%
Jackson Steel Barley.....60&20%
Kansas Header.....60%
W. & C. Favorite Wood Barley.....40%
Plated.—See Spoons.

Frames— Saw—
White, S'g't Bar, per doz..75@80¢
Red, S'g't Bar, per doz...$1.00@1.25
Red, Dbl. Brace, per doz.$1.40@1.59

Freezers, Ice Cream—

Qt.	1	2	3	4	6
Each	$1.30	$1.60	$1.90	$2.20	$2.80

Fruit and Jelly Presses—
See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse— *Per 1000 Feet.*
Hemp $2.75
Cotton 3.20
Waterproof Sgl. Taped.. 3.65
Waterproof Dbl. Taped.. 4.40
Waterproof Tpl. Taped.. 5.15
10&2½%

Gates, Molasses and Oil—
Stebbins' Pattern.....60&10%

Gauges—
Marking, Mortise, &c..50@50&10%
Chapin-Stephens Co.:
Marking, Mortise, &c.....50&50&10%
Disston's Marking, Mortise, &c..67½%
Stanley R. & L. Co.'s Butt and Rabbet Gauge.....35%
Marking and Mortise.....55%
Wire, Brown & Sharpe's.....33⅓%
Wire, Morse's.....25%
Wire, P., S. & W. Co.....30%

Gimlets— Single Cut—
Numbered assortments, per gro.
Nail, Metal, No. 1, $2.00; 2, $2.30
Spike, Metal, No. 1, $4.00; 2, $4.80
Nail, Wood Handled, No. 1, $2.30; 2, $2.60
Spike, Wood Handled, No. 1, $4.30; 2, $4.60

Glass, American Window
See *Trade Report.*

Glasses, Level—
Chapin-Stephens Co.....65@65&10%

Glue, Liquid Fish—
Bottles or Cans, with Brush..25&10@50%
International Glue Co. (Martin's)..40%

Grease, Axle—
Common Grade....gro. $4.50@6.00
Dixon's Everlasting, 10-lb pails, ea. 85¢; in boxes, ℔ doz., 1 lb, $1.20; 2 lb.....$2.00
Helmet Hard Oil.....25%

Griddles, Soapstone—
Pike Mfg. Co.....33⅓@33⅓&10%

Grindstones—
Pike Mfg. Co.:
Improved Family Grindstones, ℔ inch, ℔ doz., $2.00.....33⅓%
Royal Mfg. Co.:
Alundum Grinding Machines, each, Nos. 01, $1.75; 1A, $2.50; 10, $5.00 .....30%
Alundum Sickle Grinders, each, Nos. 20A, $6.00; 20A Combined, $6.50 .....30%
Alundum Disc Grinders, each, $2.50 .....30%

Grips, Nipple—
Perfect Nipple Grips.....40&10&2%

Halters and Ties—
Cow Ties.....60&5@60&10%
Covert Mfg. Co.:
Web .....30&2%
Jute Rope.....35%
Sisal Rope.....20%
Cotton Rope.....45%
Hemp Rope.....45%
Oneida Community:
Am. Coil and Halters.....40@40&5%
Am. Cow Ties.....45@50%
Niagara Coil and Halters..45@50&5%
Niagara Cow Ties....45&5@50&10&5%

Hammers—
Handled Hammers—
Heller's Machinists'...55&10@55&10&5%
Heller's Farriers'.....40&5@40&10&5%
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50, $1.75.....50%
Peck, Stow & Wilcox, Steel.....50%
Fayette R. Plumb:
A. E. Nail.....40&2½@40&12½%
Eng. and B. S. Hand....50&12½@60%
Machinists' Hammers... 50&15@60&5%
Rivet and Tinners'..40&2½@40&12½%
Vaughan & Bushnell Mfg. Co.:
A. E. Nail.....40&2½@40&12½%
Machinists' .....50&5@60&5%

Heavy Hammers and Sledges—
Under 3 lb., per lb., 50¢.80&5@..%
3 to 5 lb., per lb., 40¢.80&5@..%
Over 5 lb., per lb., 30¢.....80&10&5@..%
Wilkinson's Smiths'...lb. 9½@10¢

Handles—
Agricultural Tool Handles
Axe, Pick, &c......60&10@60&10&5%
Hoe, Rake, &c.....40@45&5%
Fork, Shovel, Spade, &c.:
Long Handles.....40@45&5%
D Handles.....40%

Cross-Cut Saw Handles—
Atkins' 40%
Champion 50%
Disston's 50%

Mechanics' Tool Handles—
Auger, assorted...gro. $2.50@$3.00
Brad Awl.....gro. $1.65@$1.75
Chisel Handles, Ass'd, per gro.:
Tanged Firmer, Apple, $2.40@$2.65; *Hickory*.....$2.15@2.40
Socket Firming, Apple, $1.75@$1.95; *Hickory*.....$1.45@$1.60
Socket Framing, Hickory, $1.60@$1.75
File, assorted.....gro. $1.30@$1.40
Hammer, Hatchet, &c. 60&10@60&10&5%
Hand Saw, Varnished, doz. 80&85¢; *Not Varnished*...65@75¢
Plane Handles:
Jack, doz. 30¢; *Jack, Bolted*.75¢
Fore, doz. 45¢; *Fore, Bolted*.90¢
Chapin-Stephens Co.:
Carving Tool.....40@40&10%
Chisel .....65@65&10%
File and Awl.....65@65&10%
Saw and Plane.....40@40&10%
Screw Driver.....40@40&10%
Millers Falls Adj. and Ratchet Auger Handles .....20&10%
Nicholson Simplicity File Handle.... ℔ gro. $0.85@$1.50
W. A. Zelnicker Supply Co.:
Hammer, per doz., 12 in., $2.00; 14 in., $2.00; 16 in., $2.30; 18 in., $2.50; 20 in., $2.70; 22 in., $3.00; 24 in., $3.30; 26 in., $3.50; 30 in., $3.80.
Sledge, per doz., oval 30 in., $3.80; octagon, 30 in., $3.80; oval,36 in., $4.00; octagon, 36 in., $4.00.
Axe, per doz., 28 to 34 in., $5.60; 36 in., $5.80.
Adze, per doz., 36 in., $5.80; 36 in., $7.80.
Pick, per doz., R. R., 36 in., $8.00; coal, 34 in., $5.80.
Hatchet, per doz., 12 to 14 in., $2.00.

Hangers—
NOTE.—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c.
Allith Mfg. Co.:
Reliable, No. 1; Allith, No. 3; Allith Adjustable, No. 6; Reliable Parlor Door.....50%
Chicago Spring Butt Co.:
Friction 25%
Oscillating 25%
Big Twin.....25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door.....50%
Elevator 30%
Railroad 50%
Cronk & Carrier Mfg. Co.:
Loose Axle.....60&10%
Roller Bearing.....70%
Griffin Mfg. Co.:
Solid Axle, No. 10, $12.00.....70%
Roller Bearing, No. 11, $15.00.70%
Roller Bearing, Ex. Hy., No. 22, $18.00.....70%
Hinged Hangers, $16.00....60&10%
Lane Bros. Co.:
Parlor, Ball Bearing, $4.00; Standard, $3.15; No. 105, $2.85; New Model, $2.80; New Champion $2.25
Barn Door, Standard.....60&5%
Hinged .....net $6.08
Covered .....60&2½%
Special .....70&3%
Lawrence Bros.:
Advance and Sterling....60&2½%
Cleveland and Peerless..70&7½%
Clipper, No. 75.....60&5%
Crown .....60&2½%
Cyclone-Tandem .. ..net $7.50
Easy Parlor Door, Dbl. Sets, $2.50; Single Sets, $1.25.
Giant 60%
Hummer .....70&7½%
New Cyclone, Flexible, $16.00 60%
New York.....60&2½%
McKinney Mfg. Co.:
No. 1, Special, $15.....60&10%
No. 2, Standard, $18.....60&10%
Hinged Hangers, $16.....50%
Meyers' Stayon Hangers.....60&5%
Richards Mfg. Co.:
Hangers, Nos. 47, 48, 147, 247, 60&5%
Pioneer Wood Track, No. 3..$2.25
Roller B'r'g St'l Track No. 12.$2.20
Roller B'r'g St'l Track No. 13.$2.50
Roller B'r'g, Nos. 39, 41, 43, 70&7½%
Hero, Adj. Track No. 19..50&10%
Adjustable Track Tandem Trolley Track No. 16.....50&10%
Seal, Steel Track No. 8.....$2.25
Auto Adj. Track No. 22.—50&5%
Trolley B. D. No. 17, $1.25; F. D. No. 120, $2.25; No. 121, $2.45; No. 150.....$2.50
Safety Underwriters F. D. No. 101 .....50%
Tandem No. 44..2¼ and 3 60&10%
Palace, Adjustable Track No. 122 .....50&5%
Royal, Adjustable Track No. 122 .....50&10%
Ives' Wood Track No. 1.....$2.25
Trolley B. D. No. 20.....50&10%
Trolley B. D. No. 24, $1.30; No. 27, $1.40; No. 28.....$1.60
Roller Bearings, Nos. 37, 38, 39, 41, 43, 44, Sizes 1 and 2.70&7½%
Anti-friction, No. 42; No. 44, sizes 2½ and 3.....60%
Hinged Tandem No. 48....60&5%
Folding Door B. B. Swivel No. 135 .....40%
Stowell Mfg. & Foundry Co.:
Acme Parlor Ball Bearing.....30%
Ajax Hinge Door.....60%
Apex Parlor Door.....50&10&5%
Atlas 60%
Baggage Car Door.....50%
Climax Anti-Friction.....50%
Elevator 40%
Express 50%
Lundy Parlor Door.....50%
Matchless 60%
Nansen 70%
Parlor Door, 50&10%; Railroad, 50&10%
Steel, Nos. 300, 404, 500.....50%
Underwriters' Fire Door.....40%
Wild West Warehouse Door..50%
Wilbern, No. 0, net, ℔ doz..$9.00
Zenith for Wood Track.....50%
A. L. Sweet Iron Works:
Check Back, 70%; Eagle.....70%
Climax Anti-Friction.....50&10%
Hylo Hinge, New Perfection, Pilot, Pilot Hinge.....60%
Rider Wooster.....65%
Western Pattern.....70%
Taylor & Boggis F'y Co.'s Kidder's Roller Bearing.50&15&10&5%

Hangers— Garment—
Pullman Trouser, ℔ gro., 1 pair Flat Aluminoy, $9.00; 1 pair Round Nickeled, $9.00; 4 pair Round Nickeled, $27.00; 1 pair Flat Gun Metal, $12.00; 1 pair Flat Black Enameled, $7.50; 1 pair Wood Clamp, $13.50; Skirt Hangers, Folding, per gro., $21.00; Coat Hangers, Folding, per gro., $8.00; Garment Hanger Rods, Round Nickeled, per gro., $10.50; Garment Hanger Loops, Round Nickeled, per gro.....$10.50
Victor Folding.....℔ gro. $9.60
Western, W. G. Co.....75&10%

Gate—
Myers' Patent Gate Hangers, ℔ doz. net $4.50

Joist and Timber—
Lane Bros. Co.....30%

Hasps—
Griffin's Security Hasp.....50&10%
McKinney's Perfect Hasp, ℔ doz..50%

Hatchets—
Regular list, first qual..40&7½%@—
Second quality.....50&10%@—

Heaters, Carriage—
Clark, No. 5, $1.75; No. 5B, $2.00; No. 5, $2.25; No. 5D, $2.75; No. 7D, $3.00; No. 3E, $3.25; No. 1, $3.50.....25%
Clark Coal, ℔ doz., $0.75.....20%

Hinges—
Blind and Shutter Hinges—
Surface Gravity Locking Blind:
(Victor; National; 1868 O. P.; Niagara; Clark's O. P.; Clark's Tip; Buffalo.)

No.	1	3	5
Doz. pair	$0.75	1.35	2.70

Mortise Shutter:
(L. & P., O. S., Dixie, &c.)

No.	1	1½	2	2½
Doz. pair	$0.70	.65	.60	.55

Mortise Reversible Shutter (Buffalo, &c.):

No.	1	1½	2
Doz. pair	$0.70	.65	.60

North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50.....10%
Charles Parker Co.....70@75%
Parker Wire Goods Co.:
Hale & Benjamin Automatic Blind Hinges 20%
Hale's Blind Awning Hinges, No. 110, for wood, $9.00; No. 111, for brick, $9.00.....20%
Reading's Gravity.....30%
Stanley's Steel Gravity Blind Hinges, No. 1647½, ℔ doz. sets, without screws, $0.95; with screws, $1.25.
Wrightsville Hardware Co.:
O. S., Lull & Porter.....70&10&2½%
Acme, Lull & Porter.....70&5&2½%
Queen City Reversible.....70&5&2½%
Shepard's Noiseless, Nos. 60, 65, 55 .....70&10&2½%
Niagara, Gravity Locking, Nos. 1, 3 & 5.....10&10&2½%
1868, Old Pat'n, No. 1.....75%
Nos. 3 & 5.....70&10&2½%
Tip Pat'n, No. 1.....75%
No. 3.....70&10&2½%
Buffalo Gravity Locking, Nos. 1, 3 & 5.....70&5%
Shepard's Double Locking.70&5&2½%
Champion Gravity Locking.....70&10&2½%
Pioneer 75%
Empire 60%
W. H. Co.'s Mortise Gravity Locking, No. 2.....60%

Gate Hinges—
Clark's or Shepard's—Doz. sets:

No.	1	2	3
Hinges with L't'chs.	$2.00	2.70	5.00
Hinges only.....	1.40	2.05	3.80
Latches only.....	.70	.70	.35

New England:
With Latch.....doz. ...@$2.00
Without Latch...doz. ...@$1.60
Reversible Self-Closing:
With Latch.....doz. ...@$1.75
Without Latch...doz. ...@$1.35
Western:
With Latch.....doz. $1.75
Without Latch.....doz. $1.15
Wrightsville Hardware Co.:
Shepard's or Clark's Hinges and Latches, Hinges only or Latches only, Nos. 1, 2 or 3.....65&5%

Pivot Hinges
Bommer Bros. Pivot.....40%
Lawson Mfg. Co. Matchless.....50%

Spring Hinges—
Holdback, Cast Iron...$6.50@$7.00
Non-Holdback, Cast Iron$6.25@$6.75
J. Bardsley:
Bardsley's Non-Checking Mortise Floor Hinges.....40%
Bardsley's Patent Checking.33⅓%
Bommer Bros.:
Bommer Ball Bearing Floor..40%
Bommer Spring Hinges.....40%
No. 999 Wrot. Steel Hold Back, ℔ gr. $9.00
Chicago Spring Butt Co.:
Chicago Spring Hinges.....25%
Triple End Spring Hinges....50%
Chicago (Ball Bearing) Floor..50%
Garden City Engine House....25%
Keene's Saloon Door.....25%
Columbian Hardware Co.:
Acme, Wrought Steel.....30%
Acme, Brass.....25%
American 30%
Columbia, ℔ gr., No. 14, $9.00; No. 18, $25.00
Columbia, Adj., No. 7, ℔ gr. $12.00
Columbian Hinges.....60&10%
Gem, new list.....30%
Clover Leaf.....℔ gr. $12.00
Oxford, new list.....30%
Floor Spring Hinges.....65&10%
Lawson Mfg. Co. Matchless....30%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges 40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door.....℔ gr. $9.00
Chief Ball Bearing Floor Hinge 50%
Ball Bearing Door.....25%
No. 777, Sheet Steel Holdb'k, ℔ gr. pr.....$9.00
Superior Spring Hinge Co.:
Superior Floor Hinges.....33⅓%
The Stover Mfg. Co.:
Ideal, No. 16, Detachable, ℔ gr. $12.50
Ideal, No. 4.....℔ gr. $9.00
New Idea No. 1.....℔ gr. $9.00
New Idea, Double Acting.....50%
New Idea Floor.....50%

Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—
Strap and T Hinges, &c., list December 20, 1904:
Light Strap Hinges.....60%
Heavy Strap Hinges.....65%
Light T Hinges.....55%
Heavy T Hinges.....45%
Extra Heavy T Hinges.60%
Hinge Hasps.....40%
Cor. Heavy Strap.....65%
Cor. Ex. Heavy T.....60%
Extra 10&10%
Screw Hook and Strap.
6 to 12 in...lb. 5½¢
14 to 20 in...lb. 5½¢
22 to 36 in...lb. 5½¢
Screw Hook and Eye:
¾ to 1 inch.....lb. 6½¢
⅝-inch.....lb. 7½¢
½-inch.....lb 8½¢

Hitchers, Stall—
Covert Mfg. Co., Stall Hitchers..30&2%

Hods— Coal—
M'f'gr's list, price per gross.

	15	16	17	18	
Inch					10&5%
Galv. Open	$35	$39	$42	$46	
Jap. Open	26	28	31	35	
Galv. Funnel	43	48	52	56	
Jap. Funnel	33	36	39	43	

Masons' Etc.—
Cleveland Wire Spring Co.:
Steel Brick, No. 162.....each $1.05
Steel Mortar, No. 158.....each $1.35

Hoes— Eye—
Scovil and Oval Pattern.....60&10@60&10&10%
Grub, list Feb. 23, 1899.....70&10@75&10%
D. & H. Scovil.....30%

Handled—
NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.
Cronk's Weeding, No. 1, $2.75; No. 2, $2.50
Star Double Bit.....$3.20
Ft. Madison Cotton Hoe....70&10&10%
Ft. Madison Crescent Cultivator Hoe, ℔ doz.....70&10%
Ft. Madison Mattock Hoes:
Regular Weight.....℔ doz. 66⅔%
Junior Size.....℔ doz. $4.00
Ft. Madison Sprouting Hoe..℔ doz. 60%
Ft. Madison Dixie Tobacco Hoe.....75&10&7½%
Kretsinger's Cut Easy.....70&10%
Warren Hoe.....45&10%
W. & C. Ivanhoe.....75&2%
B. B. 6 in., Cultivator Hoe.....$3.15
B. B., 6½ in.....$3.35
Acme Wedding.....℔ doz., net, $4.35
W. & C. L'tning Shuffle Hoe, ℔ doz.$4.85

Hoisting Apparatus—
See *Machines, Hoisting.*

Holders— Bit—
Angular, ℔ doz. $24.00.....45&10%

Door—
Bardsley's, Iron, 40%; Brass and Bronze.....33⅓%
Empire.....50%
Pullman.....35%
Superior.....33⅓%

File and Tool—
Nicholson File Holders and File Handles.....33⅓@40%

Fruit Jar—
Triumph Fruit Jar Holder, ℔ gross, $10.80; ℔ doz.....$1.25

Trace and Rein—
Fernald Double Trace Holder, ℔ doz. pairs.....$1.25
Dash Rein Holder, ℔ doz. pairs..$1.25

Hones—Razor—
Pike Mfg. Co., Belgian, German and Swaty.....50%

Hooks—Cast Iron—
Bird Cage, Reading.....40%
Clothes Line, Reading List.....40%
Clothes Line, Stowell's.....70%
Coat and Hat, Reading.....45&20%
Coat and Hat, Stowell's.....70%
Coat and Hat, Wrightsville.....65%
Harness, Reading List.....40%
Harness, Stowell's.....60%
School House, Stowell's.....70%

Wire—
Belt.....80%
Wire U. & H. Hooks:.....75@75&10%
Columbian Hdw. Co., Gem.....70&5%
Parker Wire Goods Co., King..70&10%
Western W. G. Co. Molding.....75%
Wire Goods Co.:
Acme, 60&10%; Chief, 70%; Crown, 75%; Czar, 65%; V Brace, 75%; Czar Harness, 50&10%.

Wrought Iron—
3ox, 6 in., per doz., $1.00; 8 in., $1.25; 10 in., $2.50.
Cotton.....doz. $1.05@$1.25
Wrought Staples, Hooks, &c.—
See Wrought Goods

Miscellaneous—
Hooks, Bench, see *Stops, Bench.*
Bush, Light, doz. $4.75; Medium, $5.35; Heavy, $6.25
Grass, best, all sizes, per doz.$1.60
Grass, common grades, all sizes, per doz.....$1.30
Whiffletree.....lb. 5¾@6¢
Hooks and Eyes:
Brass.....60&5@60&10&5%
Malleable Iron.....70@70&10%
Coverd Mfg. Co. Gate and Scuttle Hooks.....40%
Ft. Madison Cut-Easy Corn Hooks, ℔ doz. $3.25 net
Turner & Stanton Co. Cup and Shoulder.....80&10&10%
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Horse Nails—
See *Nails, Horse.*

Horseshoes—
See *Shoes, Horses.*

Hose, Rubber—
Garden Hose, ¾-inch:
Competition.....ft. 5 @ 6 ¢
3-ply Guaranteed..ft. 8 @ 9 ¢
4-ply Guaranteed..ft. 10 @11 ¢
Cotton Garden, ¾-in., coupled:
Low Grade.....ft. 8 @ 9 ¢
Fair Quality.....ft. 10 @11 ¢

Irons— Sad—
From 4 to 10.....lb. 3 @3¼¢
B. B. Sad Irons.....lb. 3¼@3¼¢
Mrs. Potts', cents per set:

Nos.	50	55	60	65
Iron'd Tops	80	77	90	88
Tin'd Tops	85	82	95	92

New England Pressing..lb. 3¼@3¼¢

Pinking—
Pinking Irons.....doz. 90¢

Irons, Soldering
See *Copiers.*

Jacks, Wagon—
Covert Mfg. Co.:
Auto Screw.....30&2%; Steel, 45%
Lockport.....50%
Lane's Steel.....30&10&2%
Richards' Tiger Steel, No. 130...50&10%
Smith & Hemenway Co.'s.....25%

Kettles—
Brass, Spun, Plain.....20@25%
Enameled and Cast Iron—See Ware, Hollow.

Knives—

Butcher, Kitchen, &c.—
Foster Bros.' Butcher, &c.....30%
Wilkinson Shear & Cutlery Co.....60%

Corn—
Wilkinson Shear & Cutlery Co., Wilcut Brand Knives and Hooks.60%
Withington Acme, ℔ doz., $2.65; Dent, $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

Drawing—
Standard List.....75&5@75&10%
C. E. Jennings & Co., Nos. 45, 46..60%
Jennings & Griffin, Nos. 41, 42....75%
Swan's.....66⅔@70%
Watrous.....16⅔%
L. & I. J. White.....20&5@25%

Hay and Straw—
Serrated Edge, per doz.$5.50@5.75
Iwan's Sickle Edge.....℔ doz. $9.50
Iwan's Serrated.....℔ doz. $10.00

Mincing—
Buffalo.....℔ gro. $13.00

Miscellaneous—
Farriers'.....doz. $3.00@3.25
Wostenholm's.....℔ doz. $3.00@3.25

Knobs—
Base, 2½-inch, Birch, or Maple, Rubber Tip.....gro. $1.25@$1.40
Carriage, Jap., all sizes..... gro. 40@45¢
Door, Mineral.....doz. 65@70¢
Door, Por. Jap'd.....doz. 70@75¢
Door, Por. Nickel..doz. $2.05@2.15
Bardsley's Wood Door, Shutters, &c.15%

Lacing, Leather—
See *Belting, Leather—*

Ladders, Store, &c.—
Allith Mfg. Co., Reliable.....50%
Lane's Store.....25%
Myers' Noiseless Store Ladders....50%
Richards Mfg. Co.:
Improved Noiseless, No. 112.....50%
Climax Shelf, No. 113.....50%
Trolley, No. 109.....50%

Ladles, Melting—
L. & G. Mfg. Co. (low list).....25%
P. S. & W.....40&10%
Reading.....50%

Lanterns—Tubular—
Regular Tubular, No. 0..... doz.$4.25@4.50
Lift Tubular, No. 0..... doz.$4.75@5.00
Hinge Tubular, No. 0..... doz.$4.75@5.00
Other Styles.....40@40&5%

Bull's Eye Police—
No. 1, 2¾-inch.....$2.75@3.00
No. 2, 3-inch.....$3.00@3.25

Lasts and Stands, Shoe—
Stowell's Atlas, Malleable Iron.....50%
Stowell's Badger, Cast Iron.....50%

Latches— Thumb—
Roggin's Latches, with screw.. doz. 35@40¢

Door—
Allith Mfg. Co., Automatic, No. 400, ℔ doz.....$4.00
Cronk & Carrier Mfg. Co., No. 101, ℔ doz. $2.00
Cronk & Carrier Mfg. Co., Latch, Hasp and Staples.....50%
Richards' Bull Dog, Heavy, No. 125.....50&5%
Richards' Trump, No. 127.....$1.50
Stowell's Steel.....50%

Leaders, Cattle—
Small.....doz. 50¢; large, 60¢
Covert Mfg. Co.:
Cotton, 45%; Hemp, 45%; Jute, 35%; Sisal, 20%.

Lifters, Transom—
R. & E.....10%

Lines—

Wire Clothes, Nos.	*18*	*19*	*20*
100 feet	*$2.25*	*2.00*	*1.75*
75 feet	*$1.75*	*1.35*	*1.10*

Anniston Waterproof Clothes, 50 ft., ℔ gro., $25.00; Gilt Edge, $23.00; Air Line, $23.00; Acme, $18.00; Alabama, $17.00; Empire, $16.00; Advance, $14.00; Eclipse, $13.50; Chicago, $11.50; Standard, $10.50; Columbia, $9.50; Allston, $13.50; Calhoun, $12.00.
Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3..40%
Solid Braided Masons'.....30%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50.....℔ gr. 20%
Masons' Lines, Shade Cord, &c.:
White Cotton, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50.....20%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50.....20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 90 ft., $4.25; 90 ft., $4.75; 120 ft., $5.25.....20%

Locks— Cabinet—
Cabinet Locks.....33⅓%

Door Locks, Latches, &c.—
NOTE.—Net Prices are very often made on these goods.
Reading Hardware Co.....40%
R. & E. Mfg. Co.....10%

Elevator—
Stowell's.....50%

Padlocks—
R. & E. Mfg. Co. Wrought Steel and Brass.....75&10%

Sash, &c.—
Ives' Patent:
Bronze and Brass, 60%; Crescent, 40&20%; Iron, 60%; Window Ventilating, 55%; Robinson Pat. Ventilating Sash Lock, 33⅓%; Wrought Bronze and Brass, 55%; Wrought Steel, 55%.
Pullman Patent Ventilating Lock..35%
Reading.....40%

Machines—Boring—
Com. Upr't, without Augers. $2.00@2.25
Com. Angl'r, without Augers, $2.25@2.50
Swan's Improved.....40&10%
Jennings', Nos. 1 and 4.....33⅓%
Millers' Falls.....5.75
Snell's, Upright, $2.65; Angular, $2.90

Corking—
Reisinger Invincible Hand Power.... ℔ doz. $18.00

Fence—
Williams' Fence Machines....each, $5.50

Hoisting—
Moore's Anti-Friction Chain Hoist.30%
Moore's Hand Hoist, with Lock Brake.....20%
Moore's Cyclone High Speed Chain Hoist.....25%

Ice Cutting—
Chandler's.....12½%

Washing—

Boss Washing Machine Co.:	Per doz.
Boss No. 1	$57.00
Boss Rotary	$57.00
Champion Rotary Banner No. 1	$57.00
Standard Champion No. 1	$50.00
Standard Perfection	$27.00
Cincinnati Square Western	$33.00
Uneeda American, Round	$33.60

Mallets—
Hickory.....45&5@50%
Lignumvitæ.....45&5@50%
Tinners' Hickory and Applewood.....doz. 45&5@50%

Mangers, Stable—
Swett Iron Works.....50%

Mashers, Vegetable—
Western, W. G. Co., Potato....60&10%

Mats, Door—
Elastic Steel (W. G. Co.), new list.50%
Keystone Wire Matting Co.:
Keystone.....50%
Ideal.....50%

Mattocks—
See *Picks and Mattocks.*

Milk Cans—See *Cans, Milk.*

Mills, Coffee, &c.—
Enterprise Mfg. Co.....20@25%
National list Jan. 1, 1902.....30%
Parker's Columbia & Victoria..50&10@60%
Parker's Box and Side.....50&10@60%
Swift, Lane Bros. Co.....30%

Motors Water—
Divine's Red Devil.....30%

Mowers, Lawn—
NOTE.—Net prices are generally quoted
Cheapest.....all sizes, $1.85@2.00
Cheap.....all sizes, $2.00@2.50
Better Grade..all sizes, $2.50@4.50

	12	*14*	*16*	*18-in.*
High Grade	*$4.50*	*4.75*	*5.00*	*5.25*

Continental.....60&5%
Great American.....70%
Great American Ball B'r'g, new list.70%
Quaker City.....70%
Pennsylvania.....60&5%
Pennsylvania, Jr. Ball Bearing....60%
Pennsylvania Golf.....50%
Pennsylvania Horse.....33⅓&5%
Pennsylvania Pony.....40&5%
Granite State:
Style A, Low Wheel.....70&10&10%
Style B, Low Wheel.....70&10%
Style C, High Wheel, spcl. disct., 70&10%
Style D, High Wheel, spcl. disct.70%
Philadelphia:
Styles M., S., C., K., T....70&10&5%
Style A, all Steel.....60&10&5%
Style E, High Wheel.....70&10&5%
Drexel and Gold Coin, special list.40%
Horse.....40&5%
Pony.....40&5%
36-in. Horse.....30&10%
Eagle Horse.....30&5%
I. X. L. Horse.....50%

Nails—
Wire Nails and Brads, Miscellaneous.....87½@87½&10%
Cut and Wire. See *Trade Report.*
Hungarian, Finishing, Upholsterers' &c. See *Tacks.*

Horse—

Nos.	6	7	8	9	10	
Anchor	23	21	20	19	18	...40&5%
Champlain	28	26	25	24	23	.....50%
Coleman	13	12	12	11	11	.....net
New Haven	23	21	20	19	18	...40&5%
Livingston	19	18	17	16	16	.....10%

Western.....℔ lb. 8½¢
Jobbers' Special Brands..... per lb.9@10¢

Picture—

	1½	*2*	*2¼*	*3*	*in.*
Brass H'd	*.45*	*.55*	*.60*	*.70*	*.. gro*
Por. Head	*1.10*	*1.10*	*1.10*		*.. gro*

Nippers—
See Pliers and Nippers.

Nuts—
Cold Punched: Off list
Square, Blank or Tapped..4.80¢
Hexagon, Blank or Tapped..5.10¢
Square, Bl'k, C., T. & R....5.10¢
Hexagon, Bl'k, C., T. & R..5.70¢
Hot Pressed:
Square, Blank.....5.00¢
Hexagon, Blank.....5.40¢
Square, Tapped.....4.70¢
Hexagon, Tapped.....5.10¢

Oakum—
Best.....lb., 6½¢
U. S. Navy.....lb., 6¢
Navy.....lb., 5¢
Plumbers' Spun Oakum.....3½¢
In carload lots ½¢ lb. off, f.o.b. New York.

Oil Tanks—See *Tanks, Oil.*

Oilers—
Brass and Copper.....50&10%
Tin or Steel.....65&10&5@70%
Zinc.....65&10&5@70%
Chase or Paragon:
Brass and Copper.....50&10%
Tin or Steel.....65&10%
Zinc.....65&10%
Malleable, Hammers' Improved, Nos. 11, 12 and 13, 20%; Old Pattern, Nos. 1, 2, 3, 50%.
American Tube & Stamping Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, &c.....60@60&10%

Openers— Can— *Per doz.*
Sprague, Iron Handle....30@35¢
Sprague, Wood Handle...35@40¢
Sardine Scissors.....$1.75@$3.00
Vim Tin Shear and Can Opener, ℔ doz., 75c.; per gro., $7.50
Yankee Can and Bottle Opener, ℔ doz., net.....$0.75

Egg—
Nickel Plate, ℔ doz., $2.00; Silver Plate, $4.00.

Packing—
Asbestos Packing, Wick and Rope.....20@25¢

Rubber—
(Fair quality goods.)
Sheet, C. I.....11@12¢
Sheet, C. O. S.....11@12¢
Sheet, C. B. S.....12@13¢
Sheet, Pure Gum.....40@45¢
Sheet, Red.....40@50¢
Jenkins' '96, ℔ lb. 80¢.....25%

Miscellaneous—
American Packing...lb. 7@10 ¢
Cotton Packing.....lb. 16@25 ¢
Italian Packing.....lb. 9@12½¢
Jute.....lb. 4@ 4½¢
Russia Packing.....lb. 8@11 ¢

Pails, Creamery—
R. M. Co., with gauges, ℔ doz., No. 1, $6.25; No. 2, $6.50.

Pails, Water, Well, &c.—
See *Buckets.*

Pans— Dripping—
Standard List.....70&10@75%
Edwards, Royal Blue.....65&7½%

Fry—
Common Lipped:

Nos.	1	2	3	4	5
Per doz.	*$0.75*	*0.80*	*0.90*	*1.10*	*1.30*

Refrigerator, Galva.—
Inch..... 12 14 16 18
Per doz.....$1.75 2.25 2.80 3.15

Roasting and Baking—
Regal, R. M. Co., ℔ doz., Nos. 5, $1.50; 10, $5.25; 20, $5.75; 30, $6.25.
Savory, ℔ doz., net, Nos. 200, $9.00; 400, $15.00.
Simplex, ℔ gro.:

No.	40	50	80	140	150	160
	$30.00	35.00	42.00	34.00	39.00	46.00

Paper—Building Paper
Asbestos: lb.
Roll Board or Building Felt, 6 to 30 lb., per 100 sq. ft.3½to5¢
Roll Board or Building Felt, 3-32 and ⅛ in., 45 to 60 lb., per 100 sq. ft.....6¢
Mill Board, Sheet, 40 x 40 in., 1-32 to ⅛ in.....3@5¢
Per roll
Rosin Sized Sheathing: 500 sq. ft. Light weight, 25 lbs. to roll 40@50¢
Medium weight, 30 lbs. to roll. 50@55¢
Heavy weight, 40 lbs. to roll... 65@70¢
Black Water Proof Sheathing, 500 sq. ft., 1 ply, 65¢; 2 ply, 85¢; 3 ply, $1.10; 4 ply, $1.25.
Deafening Felt, 9, 6 and 4½ sq. ft. to lb. ton.....$50.00
Red Rope Roofing, 250 sq. ft. per roll.....$1.75

Tarred Paper—
1 ply (roll 400 sq. ft.), ton..... $31.00@$35.00
2 ply, roll 108 sq. ft.....57¢
3 ply, roll 108 sq. ft.....80¢
Slater's Felt (roll 500 sq. ft.).76¢

Sand and Emery—
Flint Paper and Cloth.50&10@—%
Garnet Paper and Cloth....25%
Emery Paper and Cl'h..50&10@60%

Parers— Apple—
Advance.....℔ doz. $4.00
Baldwin.....℔ doz. $4.00
Bonanza Improved.....each $6.50
Daisy.....℔ doz. $4.00
Dandy.....each $7.50
Eureka Improved.....each $20.00
Family Bay State.....℔ doz. $15.00
Improved Bay State.....℔ doz. $36.00
Little Star.....℔ doz. $5.00
New Lightning.....℔ doz. $7.00
Reading 72.....℔ doz. $7.00
Reading 78.....℔ doz. $6.25
Rocking Table.....℔ doz. $8.25
Turn Table 88.....℔ doz. $8.00
White Mountain.....℔ doz. $5.00

Potato—
Saratoga ..... ℔ doz. $7.00
White Mountain ..... ℔ doz. $6.00

Picks and Mattocks—
List, Feb. 23, 1899 . . 70&5@70&10%
Cronk's Handled Garden Mattock, ℔ doz., No. 2, $2.60; No. 3, $6.40.

Pinking Irons—
See *Irons, Pinking.*

Pincers—
Vaughan & Bushnell Mfg. Co.:
Blacksmiths', per doz., 10 in., $5.00; 12 in., $5.50; 14 in., $6.00.
Carpenters' Claw, per doz., 6 in., $2.00; 8 in., $2.75; 10 in., $3.50.

Pins, Escutcheon—
Brass ..... 50&10@60%
Iron, list Nov. 11, '85 . . 60@60&10%

Pipe, Cast Iron Soil—
Carload lots.
Standard, 2-6 in. 50&10@50&10&5%
Extra Heavy, 2-6 in. ..... 65&10%
Fittings ..... 70&10@70&10&5%

Pipe, Merchant—
Consumers, Carloads.

	Steel.		*Iron.*	
	Blk.	*Galv.*	*Blk.*	*Galv.*
	%	%	%	%
⅛ & ¼ *in.* . . .	66	50	59&5	43&5
⅜ *in.*	68	54	61&5	43&5
½ *in.*	70	58	63&5	51&5
¾ *to 6 in.* . . .	74	64	68&5	58&5
7 to 12 in. . . .	69	54	63&5	48&5

Pipe, Vitrified Sewer—
Carload lots.
Standard Pipe and Fittings, 3 to 24 in., f.o.b. factory:
First-class 84%
Second-class 87%
NOTE.—Market irregular.

Pipe, Stove—
Per 100 joints.

Edwards' Nested:	C. L.	L. C. L.
5 in., Standard Blue	$6.25	$7.25
6 in., Standard Blue	6.75	7.75
7 in., Standard Blue	7.75	8.75
5 in., Royal Blue	7.00	8.00
6 in., Royal Blue	7.50	8.50
7 in., Royal Blue	8.50	9.50

Planes and Plane Irons—
Wood Planes—
Bench, first qual. . . . . . 30@30&10%
Bench, second qual. . . . 40@40&10%
Molding ..... 25@25&10%
Bailey's (Stanley R. & L. Co.) . 35&2½%
Chapin-Stephens Co.:
Bench, First Quality 30%
Bench, Second Quality 40%
Molding and Miscellaneous 25%
Toy and German 30%
Union 60%

Iron Planes
Bailey's (Stanley R. & L. Co.) 35%
Chapin's Iron Planes ..... 50&10%
Miscellaneous Planes (Stanley R. & L. Co.) ..... 30&5%
Union 60%

Plane Irons—
Wood Bench Plane Irons, list Dec. 12, '06 ..... 25%
Buck Bros. 30%
Chapin-Stephens Co. 25%
Stanley R. & L. Co. 35%
Union 50%
L. & I. J. White ..... 20&5@25%

Planters, Corn, Hand—
Kohler's Eclipse ..... ℔ doz. $8.00

Plates—
Felloe ..... *lb. 4@4¼¢*
Self-Sealing Pie Plates (R. M. Co.) ℔ doz. $2.00 ..... 50%

Pliers and Nippers
Button Pliers ..... 75@75&10%
Gas Burner, per doz., 5 in., $1.25 @ $1.30; 6 in., $1.45 @ $1.50.
Gas Pipe . . 7 8 10 12-in.
$2.00 $2.25 $2.75 $3.50
Acme Nippers ..... 50&5%
Cronk & Carrier Mfg. Co.:
American Button 80%
Improved Button ..... 75&10%
Cronk's 60%
No. 80 Linemen's 50%
Stub's Pattern 45%
Combination and others 33⅓%
Heller's Farriers' Nippers, Pincers and Tools ..... 40&5@40&10&5%
The Nettleton Mfg. Co. Reversible Cutting Nippers 40%
C., S. & W. Tinners' Cutting Nippers 40%
Wm. Schollhorn Co.:
Bernard, 33⅓%; Elm City, 33⅓%; Paragon, 50%; Lodi, 50%.
Swedish Side, End and Diagonal Cutting Pliers 50%
Utica Drop Forge & Tool Co.: Pliers and Nippers, all kinds 40%
Vaughan & Bushnell Mfg. Co.:
Gas Burner, per doz., 5 in., $2.50; 6 in., $3.00.
Gas, per doz., 7 in., $3.50; 8 in., $3.75; 10 in., $4.50.
Nippers, Horseshoers' Cutting, 40%; Hoof Paring 40%

Plumbs and Levels—
Chapin-Stephens Co.:
Plumbs and Levels ..... 30@30&10%
Chapin's Imp. Brass Cor. . 40@40&10%
Pocket Levels ..... 30@30&10%
Extension Sights ..... 30@30&10%
Machinists' Levels ..... 40@40&10%
Disston's Plumbs and Levels . . . . 60&10%
Disston's Pocket Levels ..... 60&10%
C. E. Jennings & Co.'s Iron 33⅓%
C. E. Jennings & Co.'s Iron, Adjustable ..... 40&7½%
Stanley R. & L. Co. 40%
Stanley's Duplex 30%
Woods' Extension 33⅓%

Poachers, Egg—
Buffalo Steam Egg Poachers, ℔ doz., No. 1, $6.00; No. 2, $9.00; No. 3, $9.00; No. 4, $12.00 ..... 50%

Points, Glaziers'—
Bulk and 1-lb. papers . . . . . *lb. 10¢*
¼-lb. papers ..... *lb. 9@10¼¢*
⅛-lb. papers ..... *lb. 9¾@11¢*

Pokes, Animal—
Ft. Madison Hawkeye ..... ℔ doz. $3.25
Ft. Madison Western ..... ℔ doz. $4.00

Police Goods—
Manufacturers' Lists . . . 25@25&5%
Tower's 25%

Polish—Metal, Etc—
Glasbrite, No. 2, 5 lb can (powder), each, $1.25; ℔ doz., $12.00; No. 2, 10 lb can (cake), each, $2.50; ℔ doz., $24.00.
Prestoline Liquid, No. 1 (½ pt.). ℔ doz., $3.00; No. 2 (1 qu.), $9.00. . 40%
Prestoline Paste 40%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ℔ doz. 50¢; ℔ gro. $4.50; ½ lb boxes, ℔ doz. $1.25; 1 lb boxes, ℔ doz. $2.25.
U. S. Liquid, 8 oz. cans, ℔ doz., $1.25.
Barkeepers' Friend Metal Polish, ℔ doz., $1.75.

Stove—
Black Eagle Benzine Paste, 5 lb cans, ℔ lb 10¢
Black Eagle, Liquid, ½ pt. cans.. ℔ doz. 75¢
Black Jack Paste, ¾ lb cans, ℔ gr. $9.00
Black Kid Paste, 5 lb can . . . . each. $0.65
Ladd's Black Beauty Liquid, per 100 tins $6.75
Joseph Dixon's, ℔ gr. $5.75 ..... 10%
Dixon's Plumbago ..... ℔ lb 8¢
Fireside ..... ℔ gr. $2.50
Gem, ℔ gr. $4.50 ..... 10%
Japanese ..... ℔ gr. $3.50
Jet Black ..... ℔ gr. $3.50
Peerless Iron Enamel, 10 oz. cans.. ℔ doz. $1.50
Wynn's Black Silk:
Paste, cans, ℔ doz., 5 oz., $0.75; ½ lb, $1.00; 1 lb $1.75
Paste, ℔ 5 lb can $0.70
Liquid, cans, ℔ doz., 6 oz., $0.75; ½ pt., $1.00; 1 pt $1.75
Steel Range Enamel, ℔ doz., ¼ pt., $1.00; ½ pt., $1.25.

Poppers, Corn—
1 qt. Square . doz. $0.80; gro. $8.00
1 qt. Round . . doz. $0.90; gro. $9.00
1½ qt. Square . doz. $1.00; gro. $10.00
2 qt. Square . . doz. $1.20; gro. $12.00

Post Hole and Tree Augers and Diggers—
See also *Diggers, Post Hole, &c.*

Posts, Steel—
Steel Fence Posts, each, 5 ft., 42¢; 6 ft., 46¢; 6½ ft., 48¢.
Steel Hitching Posts ..... each $1.30

Potato Parers—
See *Parers, Potato.*

Pots, Glue—
Enameled ..... 35&10%
Tinned ..... 30&10%

Powder—
In Canisters:
Duck, 1 lb . . . . . *each 45¢*
Fine Sporting, 1 lb . . . . *each 75¢*
Rifle, ½-lb . . . . . *each 15¢*
Rifle, 1-lb . . . . . *each 25¢*
In Kegs:
12½-lb. kegs *$3.50*
25-lb. kegs *$4.50*
King's Semi-Smokeless:
Keg (25 lb bulk) $6.50
Half Keg (12½ lb bulk) $3.50
Quarter Keg (6¼ lb bulk) $1.90
Case 24 (1 lb cans bulk) $8.50
Half case (1 lb cans bulk) $4.50

King's Smokeless:	Shot Gun.	Rifle.
Keg (25 lb bulk)	$12.00	$15.00
Half Keg (12½ lb bulk)	6.25	7.75
Quarter Keg (6¼ lb bulk)	3.25	4.00
Case 24 (1 lb cans bulk)	14.00	17.00
Half case 12 (1 lb c. bk)	7.25	8.75

Robin Hood Sm'less Shot Gun . . 50&20%

Presses—
Fruit and Jelly
Enterprise Mfg. Co. ..... 20@25%

Seal Presses—
Morrill's No. 1, ℔ doz., $20.00 ..... 50%

Pruning Hooks and Shears
See *Shears.*

Pullers, Nail—
Cyclops 50%
Miller's Falls, No. 3, ℔ doz., $12.00 . . 33⅓&10%
Morrill's No. 1, Nail Puller, ℔ doz. $20.00 ..... 50%
Pearson No. 1, Cyclone Spike Puller, each $30.00 ..... 50%
Scranton, Case Lots:
No. 2B (large) $5.50
No. 3B (small) $5.00
Smith & Hemenway Co.:
Diamond B, case lots, ℔ doz., Large, $9.00; Small, $7.50.
Giant No. 1, ℔ doz., $18; No. 1½, $16.50; No. 3, $15 ..... 33⅓%
Staple Pullers, Utica and Davison 60%
Parrot Tack and Stub Puller, ℔ doz., 75c.; ℔ gro., $6.00

Pulleys, Single Wheel—

Inch	1½	1¾	2	3
Awning or Tackle, doz.	$0.30	.45	.60	1.05
Hay Fork, Swivel or Solid Eye. doz., ¼ in., $1.25; 5 in., $1.55				
Inch	2	2½	2½	
Hot House, doz.	$0.65	.85	1.20	
Inch	1¼	1½	1¾	2
Screw, doz.	$0.16	.19	.23	.30
Inch	1¾	2	2¼	2½
Side, doz.	$0.25	.40	.55	.60
Inch	1½	1¾	2	2½

Stowell's:
Ceiling or End, Anti-Friction . . 60&10%
Dumb Waiter, Anti-Friction . . 60&10%
Electric Light 60%
Side, Anti-Friction ..... 60&10%

Sash Pulleys—
Common Frame; Square or Round End, per doz, 1¾ and 2 in. ..... *16@19¢*
Auger Mortise, no Face Plate per doz., 1¾ and 2 in. . . . . *17@19¢*

Acme, No. 35 . . 1¾ in., 18½¢; 2 in., 20½¢
Fox-All-Steel, Nos. 3 and 1, ½ in.... ℔ doz. 50%
Grand Rapids All Steel Noiseless . . 50%
Ideal ..... 70&5%
Niagara, No. 25, 1¾ in., 18½¢; 2 in., 20½¢
No. 26, Troy . . 1¾ in., 14½¢; 2 in., 16½¢
Star, No. 26 . . 1¾ in., 18½¢; 2 in., 20½¢
Tackle Blocks—See Blocks.

Pumps—
Cistern 60%
Pitcher Spout . . . . . 75&5@75&10%
Wood Pumps, Tubing, &c. . . 45@50%
Barnes Dbl. Acting (low list) . . 40&10%
Barnes Pitcher Spout ..... 75&10%
Contractors' Rubber Diaphragm No. 2, B. & L. Block Co. $16.00
Daisy Spray Pump ..... ℔ doz. $6.50
Flint & Walling's, Fast Mail Hand, (low list) 55%
Flint & Walling's Fast Mail (low list) 55%
Flint & Walling's Tight Top Pitcher. 75&10&5%
National Specialty Mfg. Co., Measuring, Nos. 2, $6.00; 3, $5.50 ..... 30%
Myers' Pumps (low list) ..... 40&10%
Myers' Power Pumps ..... 40&10%
Myers' Spray Pumps ..... 40&10%

Pump Leathers—
Plunger and Lower Valve—Per gro.:

Inch . . .	2	2¼	2½	2¾
	$2.20	*2.50*	*2.75*	*3.00*
Inch . . .	3	3¼	3½	3¾	4
	$3.30	*3.60*	*3.85*	*4.10*	*4.40*

Plunger Cup Leathers—Per 100:

Inch . . .	2½	3	3½	4
	$2.75	*3.85*	*5.00*	*6.00*

Punches—
Saddlers' or Drive, good . . . . . *doz. 50@75¢*
Spring, single tube, good quality ..... *$1.75@2.00*
Revolving (4 tubes) ..... *doz. $3.50@3.75*
Bemis & Call Co.'s Cast St'l Drive . 50%
Morrill's Nos. 1AA, 1A, 1B, 1C, $15.00 ..... 50%
Hercules, 1 die, each $5.00 ..... 50%
Niagara Hollow Punches 40%
Niagara Solid Punches ..... 55&10%
Wm. Schollhorn Co.:
Belt and Ticket, Bernard, 33⅓%; Paragon, 50%; Lodi 50%
Tinners' Hollow, P., S. & W. Co. . 33⅓%
Tinners' Solid, P., S. & W. Co., ℔ doz., $1.44 ..... 50%

Rail—Barn Door, &c.—
Sliding Door, Painted Iron . . . . 2½@2¾¢
Sliding Door, Wrought Brass, 1⅛ in., lb., 36¢ 30%
Allith Mfg. Co.: Reliable Hanger Track 50%
Cronk's:
Double Braced Steel Rail . . ℔ ft. 3¼¢
O. N. T. Rail ..... 3¢
Hinge Rail ..... 396¢
Grillin's:
xxx, ℔ 100 ft., 1 x 3-16 in., $3.00; 1¼ x 3-16 in., 3.50.
Hinged Hanger, ℔ 100 ft., 1 x 3-16 in., $3.10; 1¼ x 3-16 in., $3.80.
Lane's:
Hinged Track, ℔ 100 ft., 1 in., $3.40; 1¼ in., $3.96.
O. N. T., ℔ 100 ft., 1 in., $3.00; 1¼ in., $3.60; 1½ in., $4.00.
Standard, 1¼ in. ..... ℔ 100 ft. $4.00
Lawrence Bros.:
℔ 100 ft. No. 201, $4.00; No. 202, $4.00
New York, 1 x 3-16 in., ℔ 100 ft. $3.00
McKinney's:
Hinged Hanger Rail, ℔ ft., 11¢ . . 50%
None Better ..... ℔ ft. 3¾¢
Standard ..... ℔ ft. 4¢
Myers' Stayon Track ..... 60&10%
Richards' Mfg. Co.:
Common, 1 x 3-6 in., $3.00; 1¼ x 3-16, $3.25; 1¼ x 3-16, $3.50.
Special Hinged Hanger Rail . . 60&10%
Lag Screw Rail, No. 65 ..... 50%
Gauge Trolley Track, ℔ ft., No. 31, 9¢; No. 32, 14¢; No. 33, 20¢.
No. 50 ..... 60&10%
Nos. 61, $3.00; 62, $3.25; 63, $3.50; 64, $4.00; 45, $3.25; 46, $3.50; 49, No. 1, $3.25; 49, No. 2, $3.50.
Stowell's:
Cast Rail ..... ℔ ft. 2¼¢
Steel Rail, Plain 25%
Wrought Bracket, 1 3-16 in. ..... ℔ ft. 3¢
Wrought Bracket, 1⅛ x 5-16 . . ℔ ft. 4¢
Swett's Hylo, ℔ ft. 11¢ 60%
P. L. B. Steel Rail ..... ℔ 100 ft. $3.00
No. 0, 1 x 3-16 ..... ℔ 100 ft. $3.00

Rakes—
NOTE.—Many goods are sold at net prices.
Fort Madison Red Head Lawn . . . $3.25
Fort Madison Blue Head Lawn . . . $2.70
Jaxson Lawn, 29 and 30 teeth, ℔ doz., net $4.25
Cronk's:
New Champion Garden, ℔ doz., 12 teeth, $15.00; 14, $16.50; 16, $18.00 . . 75%
Victor Garden, ℔ doz. 12 teeth, $15.00; 14, $16.50; 16, $18.00 ..... 80%
Queen City Lawn, ℔ doz., 20 teeth, $2.85; 24, $3.00 ..... net
Anticlog Lawn, ℔ doz. $4.00
Malleable Garden ..... 70&10%
Ideal Steel Garden, ℔ doz., 12 teeth, $15.00; 14, $16.00; 16, $18.00 ..... 80%
Kohler's:
Lawn Queen, 20-tooth . . . ℔ doz. $2.90
Lawn Queen, 24-tooth . . . ℔ doz. $3.00
Paragon, 20-tooth ..... ℔ doz. $2.70
Paragon, 24-tooth ..... ℔ doz. $2.75
Steel Garden, 14-tooth . . ℔ doz. $2.40
Malleable Garden, 14-tooth, ℔ doz. $1.75@2.00

Rasps, Horse—
Disston's 75%
Heller Bros. ..... 70&5@70&10&5%
Liverlight Bros.' Gold Medal . 70&10@75%
New Nicholson ..... 70&10@75%
See also Files.

Razors—
Liana Re-ras-le 60%
Fox Razors, ℔ doz., No. 42, $22.00; No. 44, $20.00; No. 82, Platina, $25.00. } 10@25%
Red Devil 50%
Silberstein:
Carbo Magnetic, $21.00; Griffon, No. 65, $13.50; Griffon, No. 00, $12.00; all other Razors, 40%.

Safety Razors—
Kampfe Bros.:
Star Safety, 25%; Star Interchangeable, 25%; Star Safety Corn, 25%.
Silberstein 40%

Reels, Fishing—
Hendryx:
M 6, Q 6, A 6, B 6, M 9¼, M 16, Q 16, A 16, B 16, 4008, Rubber, Populo, Nickeled Populo 20%
Aluminum, German Silv., Bronze . 25%
1240 N, 124 N 20%
3004 N, 06 N, 6 RM, G 9 ..... 25%
4 N, 6 PN, 24 N, 26 PN 20%
2904 P, 33⅓%; 2904 PN, 33⅓%; 0924 N, 33⅓%; 02084 N., 33⅓%; 002904 PN., 33⅓%; 802 N., 33⅓% 20%
986 PN, 2904 N, 974 PN 25%
5009 PN, 5009 N 20%
Competitor, 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR 20%
304 P, 304 PN, 00304 P, 00304 PN . 33⅓%

Registers—*List July 1, 1903.*
Japanned, Electroplated and Bronzed 66⅔%
White Porcelain Enamel 60%
Solid Brass or Bronze Metal, ... *40&10%*

Revolvers—
Single Action ..... *95¢@$1.00*
Double Action, except 44 cal. . *$1.80*
Double Action, 44 caliber *$2.00*
Automatic *$3.50*
Hammerless *$4.00*

Riddles, Hardware Grade
16 in. ..... *per doz. $2.50@$2.75*
17 in. ..... *per doz. $2.75@$3.00*
18 in. ..... *per doz. $3.00@$3.25*

Rings and Ringers—
Bull Rings—

	2	*2½*	*3 inch.*
Steel	*$0.70*	*0.75*	*0.80 doz.*
Copper	*$1.15*	*1.35*	*1.75 doz.*

Rea's Improved Self-Piercing, ℔ doz., Copper, 2 in., $1.25; 2½ in., $1.50; 3 in., $1.75.

Hog Rings and Ringers—
Hill's Rings, gro. boxes $4.00@4.50
Hill's Ringers, Gray Iron . . . . . *doz. 50@55¢*
Hill's Ringers, Malleable Iron . . *doz. 70@75¢*
Blair's Rings . . . per gro. $4.75@5.25
Blair's Ringers . per doz. $0.60@ .65
Brown's Rings . . per gro. $5.00@5.50
Brown's Ringers . per doz. $0.60@ .65

Rivets and Burrs—
Copper ..... *33⅓@35%*
Carriage, Coopers', Tinners, &c.: Black ..... *70&10%*
Metallic Tinned *70%*

Bifurcated and Tubular—
Assorted in Boxes.
Bifurcated, per doz. boxes, pasteboard boxes, 23@25¢; Tin boxes, 29@32¢.
Tubular, per doz. boxes, 50 count, 42¢; 100 count, 51@58¢.

Rollers—
Acme, Stowell's Anti-Friction 50%
Cronk's Stay No. 65, $0.90; No. 50 ..... $1.00
Cronk's Brinkerhoff No. 55, $0.60; No. 56 ..... $0.84
Lane's Stay 40%
Richards' Stay:
Handy Adj. and Reversible No. 53 . $0.75¢
O. K. Adj. and Reversible No. 58 . $0.50¢
Lag Screw, Nos. 55 and 57 ..... 50%
Underwriters', Nos. 59, 60 ..... 50%
Favorite, No. 54 ..... 60%
Stowell's Barn Door Stay . . ℔ doz. $1.00
Swett's Anti-Friction 50%
Screw and Spike Stay ..... ℔ doz. 65¢
Hinge Adjustable Stay ..... ℔ doz. 90¢

Rope—
Manila, 7-16 in. diam. and larger: Pure ..... *lb., 13@13½¢*
Sisal, 7-16 in. diam. and larger: Pure ..... *lb., 9½¢*
Sisal, 7-16 in. diam. and larger: No. 2 quality ..... *lb., 7¾@8¢*
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse: Mixed ..... *lb., 7¾@8¢*
Pure ..... *lb., 9¼¢*
Sisal, Tarred, Medium Lath Yarn, Coarse and Untarred: Mixed ..... *lb., 7@7½¢*
Pure ..... *lb., 8¢*
Cotton Rope: Best, ¼-in. and larger . . 18@20¢
Medium, ¼-in. and larger . 16@17¢
Common, ¼-in. and larger . . 10¢
In coils, ½¢ advance.
Jute Rope: Thread, No. 1, ¼-in. & up, lb., 9¢
Thread, No. 2, ¼-in. & up, lb., 8½¢
Old Colony Manila Transmission Rope ..... ℔ lb 17½¢

Wire Rope—
Galvanized ..... *37½&2½%*
Plain ..... *45&2½%*

Ropes, Hammock—
Covert Mfg. Co.:
Jute, 35%; Sisal 20%

Rules
Boxwood ..... *60@60&10%*
Ivory ..... *35&10@35&10&5%*
Chapin-Stephens Co.:
Boxwood 60%
Flexifold 40%
Ivory ..... 25@25&10%
Miscellaneous ..... 55@55&10%
Stephens' Combination 55%
Stationers' 1%

Keuffel & Esser Co.:
Folding, Wood....35&10%
Folding, Steel....33⅓&10%
Lufkin's Steel....50&10%
Lufkin's Lumber....60%
Stanley R. & L. Co.:
Boxwood....60%
Ivory....45%
Miscellaneous....60%
Zig Zag....40%
Zig Zag, Pin Joint....42½%
Upson Nut Co.:
Boxwood....60@60&10%
Ivory....35&10@35&10&10%

Sash Balances—
See *Balance, Sash.*

Sash Locks—
See *Locks, Sash.*

Sash Weights—
See *Weights, Sash.*

Sausage Stuffers or Fillers
See *Stuffers or Fillers, Sausage.*

Saw Frames—
See *Frames, Saw.*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Saws—
Atkins':
Circular....45%
Band....50@50&10%
Butcher Saws....50%
Cross Cuts....35%
One-Man Cross Cut....40%
Narrow Cross Cut....50%
Hand, Rip and Panel....35&5%
Miter Box and Compass....40%
Mulay, Mill and Drag....45%
Chapin-Stephens Co.:
Turning Saws and Frames..30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws....30&10&10%
Disston's:
Circular, Solid and Ins'ted Tooth..50%
Band, 2 to 18 in. wide....60%
Band, ⅛ to 1¾....60%
Crosscuts....45%
Narrow Crosscuts....50%
Mulay, Mill and Drag....50%
Framed Woodsaws....25%
Woodsaw Blades....25%
Woodsaw Rods, Tinned....15%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 76, 77, 8....25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination....30%
Compass, Key Hole, &c....25%
Butcher Saws and Blades....30%
C. E. Jennings & Co.'s:
Back Saws....25%
Butcher Saws....30%
Compass and Key Hole Saws..35&5%
Framed Wood Saws....30%
Hand Saws....20&2½%
Wood Saw Blades....35%
Millers Falls:
Butcher Saws....15&10%
Star Saw Blades....15&10%
Massachusetts Saw Works:
Victor Kitchen Saws....40&10&50%
Butcher Saws Blades....35@40%
Peace & Richardson's Hand Saws..30%
Simonds':
Circular Saws....45%
Crescent Ground Cross Cut Saws..30%
One-Man Cross Cuts....40&10%
Gang Mill, Mulay and Drag Saws..45%
Band Saws....50%
Back Saws....25@25&7½%
Butcher Saws....35@35&7½%
Hand Saws....25@25&7½%
Hand Saws, Bay State Brand....45%
Compass, Key Hole, &c..25@25&7½%
Wood Saws....40&7½%
Wheeler, Madden & Clemaen Mfg. Co.'s Cross Cut Saws....50%

Hack Saw Blades and Frames—
Atkins' Hack Saw Blades A A A..25%
Disston's:
Concave Blades....25%
Keystone Blades....35%
Hack Saw Frames....30%
Simonds File Co....35%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180....40&7½%
Hack Saws, Nos. 175, 180, complete, 40&7½%
Goodell's Hack Saw Blades....40&10%
Griffin's Hack Saw Frames..35&5&10%
Griffin's Hack Saw Blades....35&4&10%
Star Hack Saws and Blades....15&10%
Sterling Hack Saw Blades....30&10&5%
Sterling Hack Saw Frames..30&10&10%
Sterling Power Hack Saw Machines, each, No. 1, $25.00; No. 2, $30.00..10%
Victor Hack Saw Blades....25%
Victor Hack Saw Frames....40%

Scroll—
Barnes, No. 7, $15....25%
Barnes' Scroll Saw Blades....40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20....20%
Lester, complete, $10.00....15&10%
Rogers, complete, $3.50 and $4.00..15&10%

Scales—
Family, Turnbull's....50@50&10%
Counter:
Hatch, Platform, ½ oz. to ¼ lbs....doz. $5.50
Two Platforms, ½ oz. to 8 lbs....doz. $16.00
Union Platform, Plain..$1.70@1.90
Union Platform, Stpd..$1.85@2.15
Chatillon's:
Eureka....25%
Favorite....40%
Crocers' Trip Scales....50%
Chicago Scale Co.:
The Little Detective....25 lbs 50%
Union or Family No. 2....40%
Portable Platform (reduced list)..50%
Wagon or Stock (reduced list)..25@35%
The Standard Portables....45%
The Standard R. R. and Wagon....50&10%

Scrapers—
Box, 1 Handle....doz. $2.00@2.25
Box, 2 Handle....doz. $2.50@2.80
Ship....Light, $2.00; Heavy, $3.50
Adjustable Box Scraper (S. R. & L. Co.), $6.00....45%
Chapin-Stephens Co., Box...30@30&10%

Screws—Bench and Hand
Bench, Iron, doz., 1 in., $2.50@2.75; 1⅛, $3.00@3.25; 1¼, $3.50@3.75
Bench, Wood....20@20&10%
Hand, Wood....20@20&10%
R. Bliss Mfg. Co., Hand..20&5@20&10%
Chapin-Stephens Co., Hand....20%

Coach, Lag and Hand Rail—
Lag, Cone Point, list Oct. 1, '99....75&15%
Coach, Gimlet Point, list Oct. 1, '99....75&10%
Hand Rail, list Jan. 1, '81....70&10@75%

Jack Screws—
Standard List....75%
Millers Falls....50&10&10%
P., S. & W....50%
Swett Iron Works....75@80%

Machine—
List Jan. 1, '98:
Flat or Round Head, Iron, Brass or Bronze....50@50&10%
Fillister Head, Iron, Brass or Bronze....40@40&10%

Set and Cap—
Set (Iron)....75&10&7½%
Set (Steel), net advance over Iron....25%
Sq. Hd. Cap....70&10&7½%
Hex. Hd. Cap....70&10&7½%
Rd. Hd. Cap....50&7½%
Fillister Hd. Cap....60&7½%

Wood—
List July 23, 1903.
Flat Head, Iron....87½&5@...%
Round Head, Iron....85&5@...%
Flat Head, Brass....82½&5@...%
Round Head, Brass....80&5@...%
Flat Head, Bronze...77½&5@...%
Round Head, Bronze..75&5@...%
Drive Screws....87½&5@...%

Scroll Saws—
See *Saws, Scroll.*

Scythes—
	Per doz.
Grass, No. 1, Plain	*$6.25@6.75*
Clipper, Bronzed Webb	*$6.50@7.00*
No. 3 Clipper, Pol'd Webb	*$6.75@7.25*
No. 6 Clipper and Solid Steel	*$7.00@7.50*
Bush, Weed and Bramble, No. 2	*$6.50@7.00*
Grain, No. 1	*$8.25@8.75*
Bronzed Webb, No. 1	*$8.50@9.00*
Nos. 3 and 4 Clipper, Grain	*$8.75@9.25*
Solid Steel, No. 6	*$9.25@9.75*

Seeders, Raisin—
Enterprise....25@30%

Sets—Awl and Tool—
Fray's Adj. Tool Handles, Nos. 1, $12; 2, $18; 3, $12; 4, $9; 5, $7....50%
C. E. Jennings & Co.'s Model Tool Holders....30%
Millers Falls Adj. Tool Handles, No. 1, $12; No. 4, $12; No. 5, $18....15&10%

Garden Tool Sets—
Ft. Madison Three Plows, Hoe, Rake and Shovel....doz sets $9.00

Sets, Nail—
Octagon....gro. $3.50@3.75
Buck Bros....7½%
Cannon's Diamond Point, ℔ gro. $12....40&10%
Mayhew's....℔ gro $9.00
Snell's Corrugated, Cup Pt....40&10%
Snell's Knurled, Cup Pt....40&10%
Victor Knurled Cup Pt....℔ gro. $7.50

Rivet—
Regular list....75@75&10%

Saw—
Atkin's:
Criterion....40%
Adjustable....40%
Disston's Star, Monarch and Triumph....30%
Morrill's No. 1....$15.00
Nos. 3 and 4, Cross Cut....$20.60
No. 5, Mill....$30.00
Nos. 10, 11, 95....$15.60
No. 1 Old Style....$10.00
Special....$16.25
Giant Royal Cross Cut....℔ doz. $8.00
Royal, Hand....℔ doz. $4.50
Taintor Positive....℔ doz. $6.75

Shaving
Fox Shaving Sets, No. 30....
....℔ doz., net, $24.00
Smith & Hemenway Co.'s....60%

Sharpeners, Knife—
Chicago Wheel & Mfg. Co....70%
Pike Mfg. Co.:
Fast Cut Pocket Knife Hones, ℔ doz....$1.50
Mounted Kitchen Sand Stone, ℔ doz....$1.50
Natural Grit Carving Knife Hones, ℔ doz....$3.00
Quick Cut Emery Carving Knife Hones, ℔ doz....$1.50
Quick Edge Pocket Knife Hones, ℔ doz....$2.50
} 50%

Skate—
Smith & Hemenway Co., Eureka..20%

Shaves, Spoke—
Iron....doz. $1.10@1.25
Wood....doz. $1.75@2.25
Bailey's (Stanley R. & L. Co.)....45%
Razor Edge (Stanley R. & L. Co.), Iron, 50%; Wood....55%
Chapin-Stephens Co....30@30&10%
Goodell's ℔ doz. $9.00....15&10%
Wood's F1 and F2....50%

Shears—
Cast Iron..	*7*	*8*	*9 in.*	
Best	*$16.00*	*18.00*	*20.00*	*gro.*
Good	*$13.00*	*15.00*	*17.00*	*gro.*
Cheap	*$5.00*	*6.00*	*7.00*	*gro.*

Straight Trimmers, &c.:
Best quality Jap....70@70&10%
Best quality, Nickel..60@60&10%
Fair quality, Jap....80@80&5%
Fair quality, Nickel..75@75&10%
Tailors' Shears....40@40&10%
Acme Cast Shears....40@40&5%
Heinisch's Tailor's Shears....10%
Wilkinson Shear & Cutlery Co.:
Sheep, 1900 list....30&10&5%
Grass....50&10%
Horse or Mule....50&10%

Tinners' Snips—
Steel Blades....20&5@20&10%
Steel Laid Blades....40&10@50%
Forged Handles, Steel Blades, Berlin....50%
Heinisch's Snips....40%
Jennings & Griffin Mfg. Co.'s, 6½ to 10 in....50%
Niagara Snips....40%
P., S. & W. Forged Handles....20%

Pruning Shears—
Cronk's Hand Shears....33⅓%
Cronk's Wood Handle Shears....33⅓%
Disston's Combined Pruning Hook and Saw, ℔ doz. $18.00....25%
Disston's Pruning Hook only, ℔ doz. $12.00....25%
John T. Henry Mfg. Co.:
Pruning Shears, all grades....40%
P., S. & W. Co....30%
Wilkinson Shear & Cutlery Co.:
Hedge, Wilcut Brand....60&10%
Lawn and Border, Wilcut Brand....60&10%

Sheaves—Sliding Door—
Stowell's Anti-Friction....50%
Reading....40%
R. & E. list....15%
Wrightsville Hatfield Pattern....87½%

Sliding Shutter—
Reading list....40%
R. & E. list....10%

Shells—Shells, Empty—
Brass Shells, Empty:
Climax, 10 and 12 gauge....65&10%
Club, Rival, 65&5%; First Quality, 60&5%
Paper Shells, Empty:
New Rapid, 10, 12, 16 and 20 gauge, 25&10%
Climax, 10 and 12 gauge; Acme, 10, 12, 16 and 20 gauge; Ideal, 10, 12, 16 and 20 gauge; Leader grade, 25&5%
Union, League, 12 and 12 gauge; Rival Grade....25%
New Climax, Defiance, 10, 12, 14, 16 and 20 gauge; Climax, 14, 16 and 20 gauge....20&5%
Challenge, Monarch, 10, 12, 16 and 20 gauge; League, Union, 14, 16 and 20 gauge; Repeater Grade..20%
Expert, 10, 12, 16 and 20 gauge, 33⅓&5%
Robin Hood, Low Brass....20&5%
Robin Hood, High Brass....30&5%
Indian, for Black Powder....25&5%

Shells, Loaded—
Loaded with Black Powder..40%
Loaded with Smokeless Powder, medium grade....40&5%
Loaded with Smokeless Powder, high grade....40&10&10%
Robin Hood:
Smokeless Robin Hood, Low Brass....40&10%
Smokeless Comets, High Brass, 40&10&10&5%
Indian, Black Powder....40&5%
Winchester:
Smokeless Repeater Grade....40&5%
Smokeless Leader Grade...40&10&10%
Black Powder....40%

Shingles, Metal—Per Sq.
Edwards Mfg. Co.:

	Painted.	Galv.
14 x 20	$4.25	$6.00
10 x 14	4.50	6.25
7 x 10	4.75	6.50

Wheeling Corrugating Co.:

	Tin Painted.	Galv.
Dixie, 14 x 20 in	$4.25	$5.50
Dixie, 10 x 14 in	4.50	6.00
Dixie, 7 x 10 in	5.00	6.75

Shoes, Horse, Mule, &c.—
F.o.b. Pittsburgh:
Iron....per keg. $4.10
Steel....per keg. $3.85
Burden's, all sizes....℔ keg $3.90

Shot—
25-lb. bag.
Drop, up to B....$1.95
Drop, B and larger....2.20
Buck....2.20
Chilled....2.20
Dust....2.40

Shovels and Spades—
Association List, Nov. 15, 1902..40%

Snow Shovels—
Long Handle....$2.75@$3.00
Wood and Mail, D. Handle, $3.25@$3.50

Sieves and Sifters—
Hunter's Imitation....gro. $9.50@10.00
Hunter's Genuine....per gro. $12.00@12.50
Buffalo Metallic Blued, R. M. Co., ℔ gr.

14&16	16&18	18&20
$13.20	$13.50	$14.40

Sieves, Seamless Metallic
—Per dozen.—

Mesh	*14*	*16*	*18*	*20*
Iron Wire	*$1.05*	*1.05*	*1.10*	*1.20*
Tinned Wire	*$1.15*	*1.15*	*1.20*	*1.30*

Sieves, Wooden Rim—
Nested, 10, 11 and 12 Inch.
Mesh 18, Nested....doz. $0.90@0.95
Mesh 20, Nested....doz. $1.00@1.05
Mesh 24, Nested....doz. $1.30@1.40

Sinks, Cast Iron—
Painted, Standard list:
12 x 12 to 22 x 36 in....60%
20 x 40 to 24 x 50 in....50%
24 x 60 to 24 x 120 in....30%
Barnes' low list:
Up to and including 20 x 36 in....50%
20 x 40 to 24 x 50 in....45%
NOTE.—There is not entire uniformity in lists used by jobbers.

Skeins, Wagon—
Cast Iron....70@75&10%
Steel....40@45%

Slates, School—
Factory Shipments.
"D" Slates....50@50&10%
Eureka, Unexcelled Noiseless....60&5 tens
Victor A, Noiseless..60&5 tens &5%

Slaw Cutters—See *Cutters.*

Snaps, Harness—
German....40@40&10%
Covert Mfg. Co.:
Derby, 25%; Yankee, 30&2%; Yankee Roller, 30&2%
High Grade, 40%; Trojan....40%
Jockey....25%
Oneida Community:
Harness Snaps, 1 inch....60&5%
Swivel Snaps....60%
Swivels....50%

Snaths—
Scythe....50%

Snips, Tinners—See *Shears.*

Spoons and Forks—
Silver Plated—
Good Quality....50&10@60&5%
Cheap....60@60&10%
International Silver Co.:
1847 Rogers Bros., 40&10%; Rogers & Hamilton....50&10%
Rogers & Bro., William Rogers' Eagle Brand....50&10%
Anchor, Rogers Brand....60%
Wm. Rogers & Son....60&10%

Miscellaneous—
German Silver....60@60&5%
Cattaraugus Cutlery Co.:
Seneca Silver....50%

Tinned Iron—
Teas....per gro. 45@50¢
Tables....per gro. $0.50@$1.00

Springs—Door—
Bardsley's Spring and Check....40%
Chicago (Coil)....40&10%
Gem (Coil)....20%
Pullman (Coil)....35%
Reliance (Coil)....40&10%
Star (Coil)....30%
Torrey's Rod, 39 in....℔ doz. $1.10

Carriage, Wagon, &c.—
1¼ in. and Wider: Per lb
Black....4¼@4½¢
Half Bright....4¼@4½¢
Bright....4¾@5¢
Painted Seat Springs:
1½ x 2 x 26....per pr. 45@47¢
1½ x 3 x 28....per pr. 65@70¢

Sprinklers, Lawn—
Enterprise....25@30%
Philadelphia No. 1, ℔ doz. $12; No. 2, $15; No. 3, $20....30%
Pleuger & Henger Mfg. Co.:
Cactus, 65&5%; Japanese, 70&5%; Nationals, 60&5%.

Squares—
Nickel plated.. } *List Jan. 5, 1900.*
Steel and Iron.. } *75@—%*
Rosewood Hdl. Try Square and T-Bevels....60&10&10@70%
Iron Hdl. Try Squares and T-Bevels....40&10@40&10&10%
Disston's Try Squares and Bevels, Rosewood Handle, 60&10%; Iron Stock and Bevel....15%
Winterbottom's Try and Miter, No. 1, 35%; No. 2....45%

Squeezers, Lemon
Wood, Common, gro., No. 0, $5.25@$5.50; No. 1, $6.25@$6.50.
Wood, Porcelain Lined:
Cheap....doz. $1.00
Good Grade....doz. $1.25
Tinned Iron....doz. $0.75@1.25
Iron, Porcelain Lined...doz. $1.75

Staples—
Barbed Blind....lb. 6@6½¢
Electricians', Association list...80&10&10&10%
Fence Staples, Plain, $2.25; Galvanized....$2.55
Poultry Netting Staples....per lb. 3½@3½¢

Steels, Butchers'—
Dick's....30%
Foster Bros.'....30%
C. & A. Hoffmann's....40%

Steelyards—....30@30&10%

Stocks and Dies—
Blacksmiths'....50@50&10%
Curtis Rev'ble Ratchet Die Stock..25%
Derby Screw Plates....25%
Green River....25%
Lightning Screw Plate....25%
Little Giant....25%
Reece's New Screw Plates....25%

Stoners, Cherry—
Enterprise....25@30%

Stones—Oil, &c.
Chicago Wheel & Mfg. Co., 1904 list:
Gem Oil, Double Grit....65%
Gem Axe, Single or Double Grit..65%
Gem Slips....65%
Gem Razor Hones....50%
Pike Mfg. Co., 1904 list: ℔ lb.
Arkansas St. No. 1, 3 to 5½ in....$2.80
Arkansas St. No. 1, 5½ to 8 in....$3.50
Arkansas Slips No. 1....$4.00
Lily White Washita, 4 to 8 in....60¢
Rosy Red Washita, 4 to 8 in..60¢
Washita St., Extra, 4 to 8 in..50¢
Washita St., No. 1, 4 to 8 in..40¢
Washita St., No. 2, 4 to 8 in..30¢
Lily White Slips....90¢
Rosy Red Slips....90¢
Washita Slips, Extra....80¢
Washita Slips, No. 1....70¢
Washita Slips, No. 2....40¢
India O.J Stones (entire list)....33⅓%
Quickcut Emery and Corundum Oil Stone, Double Grit....33⅓%
Quickcut Emery and Corundum Axe Stone, Double Grit....33⅓%
Quickcut Emery Rubbing Bricks 33⅓%
Hindostan No. 1, R'g'lar..℔ lb 8¢
Hindostan No. 1, Small..℔ lb 10¢
Axe Stones (all kinds)....
Turkey Oil Stones, Extra, 5 to 8 in....℔ lb 80¢
Queer Creek Stones, 4 to 8 in..20¢
Queer Creek Slips....40¢
Sand Stone....6¢
} 33⅓%

Scythe Stones—

Chicago Wheel & Mfg. Co.:
Gem, ₱ gro., 10 in., $8.00; 12 in., $10.80.
Norton Alundum Scythe Stones:
Less than 10 gross lots... ₱ gro. $6.00
Lots of 10 gross or more...₱ gro. $4.50
Pike Mfg. Co., 1901 list:
Black Diamond S. S.. ₱ gro. $12.00
Lamoille S. S.....₱ gro. $11.00
White Mountain S. S. ₱ gro. $9.00
Green Mountain S. S. ₱ gro. $6.00
Extra Indian Pond S.S. ₱ gro. $7.50
No. 1 Indian Pond S.S. ₱ gro. $7.00
No. 2 Indian Pond S.S. ₱ gro. $4.50
Leader Red End S. S. ₱ gro. $4.50
Quick Cut Emery....₱ gro. $10.00
Pure Corundum.....₱ gro. $18.00
Crescent $7.00
Emery Scythe Rifles, 2 Coat. $8
Emery Scythe Rifles, 3 Coat, $10
Emery Scythe Rifles, 4 Coat, $13
Balance of 1904 list 33⅓%

Stoppers, Bottle—

Victor Bottle Stoppers.....₱ gro. $9.00

Stops— Bench—

Millers Falls.....15&10%
Morrill's, ₱ doz., No. 1, $10.00.....50%
Morrill's, No. 2, $12.50.....50%

Door—

Chapin-Stephens Co.....60@60&10%

Plane—

Chapin-Stephens Co.....20%

Straps— Box—

Cary's Universal, case lots....20&10&10%

Stretchers, Carpet—

Cast Iron, Steel Points, doz. 60@60&10%
Socket .....doz. $1.00
Bullard, ₱ doz.....$4.00
Excelsior Stretcher and Tack Hammer Combined, ₱ doz. $6.00.....20%

Woven Fence—

Franklin.....ea, $3.75

Strops, Razor—

Star Diagonal Strop.....25%

Stuffers, Sausage—

Enterprise Mfg. Co.....25@25&7½%
National Specialty Co., list Jan. 1, 1902 .....50&5%

Sweepers, Carpet—

	₱ doz.
National Sweeper Co.:	
Louis XV, Roller Bearing, Gold Plated	$120.00
Hepplewhite, Roller Bearing, Silver Plated	$72.00
Sheraton, Roller Bearing, N'kel.	$60.00
Ye Mission, Roller Bearing, Oxidized Coppered	$36.00
Transparent, Roller Bearing, Plate Glass top, Nickeled	$36.00
National Queen, Roller Bearing, Fancy Veneers	$27.00
Loyal, Roller Bearing, Veneers, Nickeled	$25.00
Triple Medal, Roller Bearing, Nickeled	$24.00
Marion, Roller Bearing, N'kel.	$24.00
Marion Queen, Roller Bearing, Nickeled	$24.00
Monarch, Roller Bearing, N'kel.	$22.00
Monarch, Roller Bearing, Jap.	$20.00
Perpetual, Regular B'r'gs, N'kel.	$20.00
Perpetual, Regular B'r'gs, Jap.	$18.00
Monarch Extra (17 in. case), Roller Bearing, Nickeled	$36.00
Monarch Extra (17 in. case), Roller Bearing, Japanned	$33.00
Auditorium (26 in. case), Roller Bearing, Nickeled	$54.00
Mammoth (30 in. case), Roller Bearing, Nickeled	$60.00

NOTE.—Rebates: 50c *per dozen on three-dozen lots;* $1 *per dozen on five-dozen lots;* $2 *per dozen on ten-dozen lots;* $2.50 *per dozen on twenty-five-dozen lots.*
Streator Metal Stamping Co.:

Eureka Japanned	₱ doz. $15.00
Model E, Sanitaire	₱ doz $25.00
Model A, Sterling	₱ doz. $25.00
Model B, Sterling, Nickeled	₱ doz. $23.00
Model B, Sterling, Japanned	₱ doz. $21.00
Model C, Sterling	₱ doz. $21.50
Model D, Sterling	₱ doz. $19.50

Tacks, Finishing Nails, &c.

New List, May 1, 1905.
American Carpet Tacks..90@30%
American Cut Tacks.....90@30%
Swedes Cut Tacks.....90@30%
Swedes' Upholsterers'....90@40%
Gimp Tacks.....90@40%
Lace Tacks.....90@40%
Trimmers' Tacks.....90@30%
Looking Glass Tacks.....65%
Bill Posters' and Railroad Tacks, 90@40%
Hungarian Nails.....80@30%
Finishing Nails.....70%
Trunk and Clout Nails.....80%

NOTE.—The above prices are for Standard Weights. An extra 5% is given on Medium Weight, and an extra 10@5% is given on light weights.

Miscellaneous—

Double Pointed Tacks..... 90c¼ or 5 tens
See also Nails, Wire.

Tanks, Oil and Gasoline—

Each

R. M. Co.: Gal.	Oil Emerald	Oil Queen City
30	$3.40	$3.65
60	$4.25	$4.50

Wilson & Friend Co.:

Gal.	Gasoline	Oil
30	$2.75	$3.00
60	$3.50	$4.00
110	$5.00	$5.75

Tapes, Measuring—

American Asses' Skin ..50@—%
Patent Leather.....25@30&5%
Steel .....33 1-3&5%
Chesterman's .....25@25&5%
Keuffel & Esser Co.:
Favorite, Ass Skin.....40&10@50%
Favorite, Duck and Leather..... 25&5@25&10%
Metallic and Steel, lower list, 35@35&5%; Pocket, 35@35&5%.
Lufkin's:
Asses' Skin.....40&10@50%
Metallic .....30@30&5%
Patent Bend, Leather....25&5@25&10%
Pocket .....40@40&5%
Steel .....33⅓&35%
Wiebusch & Hilger:
Chesterman's Metallic, No. 34L, etc. 25%
Chesterman's Steel, No. 1038L, etc. 35%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ⅝-inch and larger... per 100 lbs. $2.75@$3.00

Thermometers—

Tin Case.....80&10@80&10&5%

Ties, Bale—Steel Wire—

Single Loop.....80&10&5%
Monitor, Cross Head, &c.70&2½%

Brick Ties—

Niagara Brick Ties.....25&10%

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tire Benders, Upsetters, &c.

See *Benders and Upsetters, Tire.*

Tools—Coopers'—

L. & I. J. White.....20@20&5%

Hay—

Myers' Hay Tools.....50%
Stowell's Hay Carriers, 50%; Hay Forks, 50%; Fork Pulleys, 50%.

Miniature—

Smith & Hemenway Co.'s, Davidson 25%

Saw—

Atkins' Cross Cut Saw Tools....35&5%
Simonds' Improved.....33⅓%
Simonds' Crescent.....25%

Ship—

L. & I. J. White.....25%

Transom Lifters—

See *Lifters, Transom.*

Traps—Fly—

Balloon, Globe or Acme, doz. $1.15@$1.25; gro.....$11.50@12.00
Harper, Champion or Paragon, doz. $1.25@1.40; gro. $13.00@13.50

Game—

Imitation Oneida.....70&10%
Newhouse .....45@45&5
Hawley & Norton.....65%
Victor .....70&10%
Oneida Community Jump.....60%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes 12¢
Mouse, Round or Square Wire, doz. 85@90¢
Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat, ₱ doz., $13.25; case of 24 .....$11.50 doz.
No. 3, Rat, ₱ doz., $6.50; case of 50 .....$5.75 doz.
No. 3½, Rat, ₱ doz. $5.25; case of 72 .....$4.70 doz.
No. 4, Mouse, ₱ doz. $3.85; case of 150 .....$3.00 doz.
No. 5, Mouse, ₱ doz. $3.00; case of 150 .....$2.25 doz.

Trimmers, Spoke—

Wood's E 1.....50%

Trowels—

Disston Brick and Pointing.....25%
Disston Plastering.....20%
Disston "Standard Brand" and Garden Trowels.....30%
Kohler's Steel Garden Trowels, ₱ gro., 5 in., $4.80; 6 in., $6.00.
Never-Break Steel Garden Trowels.. ₱ gro. $6.00
Rose Brick and Plastering.....25&5%
Woodrough & McParlin, Plastering.25%

Trucks, Warehouse, &c.—

B. & L. Block Co.:
New York Pattern.....50&10%
Western Pattern.....60&10%
Handy Trucks.....₱ doz. $16.00
Grocery .....₱ doz. $15.00
Daisy Stove Trucks, Improved Pattern .....₱ doz. $18.50
McKinney Truckz.....each $10.00
Model Stove Trucks.....₱ doz. $18.50

Tubs, Wash—

M'f'gr's list, price per gross.

No.	0	1	2	3
Galvanized.	$64	$76	$84	$96

10&5%
Galvanized Wash Tubs (R. M. Co.):

No.	1	2	3	10	20	30
Per doz., net.	$5.70	6.30	7.20	6.60	7.20	8.10

Twine, Miscellaneous—

Flax Twine:
No. 9, ¼ and ½-lb. Balls.23@25¢
No. 12, ¼ and ½-lb. Balls.21@22¢
No. 18, ¼ and ½-lb. Balls.18@20¢
No. 24, ¼ and ½-lb. Balls.17@19¢
No. 36, ¼ and ½-lb. Balls.16@18¢
Chalk Line, Cotton ½-lb. Balls .....26@31¢
Cotton Mops, 6, 9, 12 and 15 lb. to doz.....11@19¢
Cotton Wrapping, 5 Balls to lb., according to quality...15½@25¢
American 2-Ply Hemp, ¼ and ½-lb. Balls.....14½@15½¢
American 3-Ply Hemp. 1-lb. Balls .....15½@16½¢
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine).10½@11½¢
India 3-Ply Hemp, 1-lb. Balls 10½@11½¢
India 3-Ply Hemp, 1½-lb. Balls. 10@11¢
2, 3, 4 and 5-Ply Jute. ½-lb. Balls .....13½@14½¢
Mason Line, Linen, ½-lb. Balls17¢
No. 2½ Mattress, ¼ and ½-lb. Balls, according to quality, 30@60¢
Wool, 3 to 6 ply....B 9¢; A 10¢

Vises—

Solid Box.....50@50&10%

Parallel—

Athol Machine Co.:
Simpson's Adjustable.....40%
Standard 40%
Amateur 25%
Columbian Hdw. Co.....40%
Emmert Universal:
Pattern Makers' No. 1, $15.00; No. 2, $12.50.
Machinist and Tool Makers' No. 4A, $12.50; No. 6A, $10.00; No. 10A, $22.50.
Presto Quick Acting, Adjustable Jaw, 25@25&10%; Solid Jaw, 35@35&10%
Tiger Machinists'.....40%
Fisher & Norris Double Screw, net, each, Nos. 2, $10.50; 3, $16.00; 4, $20.50; 5, $27.00.
Fulton Mach. & Vise Co.:
Reed, Swivel.....25%
Star, Solid Jaw.....40%
Hollands':
Machinists' .....40@40&5%
Keystone .....65&10&10%
Lewis Tool Co.:
Adjustable Jaw.....30%
Monarch, 50%; Solid Jaw.....50%
Massey Vise Co.:
Clincher 40%
Perfect, 15%; Lightning Grip.....15%
Merrill's 20%
Millers Falls Oval Slide Pattern.60&10%
Parker's:
Victor, 20@25%; Regulars.....20@25%
Vulcan's .....40@45%
Combination Pipe.....55@60%
Prentiss .....20@25%
Snediker's X. L.....33⅓%
Stephens' 33⅓%

Saw Filers—

Disston's D 3 Clamp and Guide, ₱ doz., $24.00, 30%; Clamps.....30%
Perfection Saw Clamps, ₱ doz....$4.80
Reading 60%
Wentworth's Rubber Jaw, Nos. 1, 2 and 3.....50%

Wood Workers—

Fulton Mach. & Vise Co.:
Reed 25%
Star 40%
Massey Vise Co.:
Lightning Grip, 15%; Perfect.....15%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Miscellaneous—

Holland's Combination Pipe..60@60&5%
Massey's Quick Action Pipe.....40%
Parker's Combination Pipe:
87 Series, 60%; 187 Series, 60&5%; No. 870, 40%.

Wads—*Price per M.*

B. E., 11 up.....60¢
B. E., 9 and 10.....70¢
B. E., 8.....80¢
B. E., 7.....80¢
P. E., 11 up.....$1.00
P. E., 9 and 10..... 1.25
P. E., 8..... 1.50
P. E., 7..... 1.50
Ely's B. E., 11 and larger.$1.70@1.75
Ely's P. E., 12 to 20....$3.00@3.25

Dis. 15%

Ware, Hollow—

Cast Iron, Hollow—

Stove Hollow Ware:
Enameled .....45&10%
Ground .....50&5%
Plain or Unground.....60%
Country Hollow Ware, per 100 lbs. $3.00
White Enameled Ware:
Maslin Kettles.....65&10%
Covered Wares:
Tinned and Turned.....35&10%
Enameled .....45&10%
See also *Pots, Glue.*

Enameled—

Agate Nickel Steel Ware.....60%
Iron Clad Ware.....70&10%
Lava, Enameled.....40&10%
Never Break Enameled.....50%

Tea Kettles—

Galvanized Tea Kettles:

Inch	6	7	8	9
Each	*45¢*	*50¢*	*55¢*	*65¢*

Steel Hollow Ware—

Avery Spiders and Griddles..65@65&5%
Avery Kettles.....60%
Porcelained .....50&5@50&10%
Never Break Spiders and Griddles.. 65&5%
Never Break Kettles.....60%
Solid Steel Spiders and Griddles.65&5%
Solid Steel Kettles.....60%

Warmers, Foot—

Pike Mfg. Co., Soapstone....40@40&10%

Washboards—

Solid Zinc: ₱ doz.
Crescent, family size, bent frame.$3.70
Red Star, family size, stationary protector $3.70
Double Zinc Surface:
Saginaw Globe, family size, stationary protector.....$3.25
Cable Cross, family size, stationary protector.....$3.40
Single Zinc Surface:
Naiad, family size, open back, perforated $2.90
Single Saginaw Globe.....$2.75
Brass Surface:
Brass King, Single Surface, open back $3.65
Nickel Plate Surface:
No. 1001 Nickel Plate, Single Surface $3.65
Glass Surface:
Glass King, Single Surface, open back $3.65
Enamel Surface:
Enamel King, Single Surface, ventilated back.....$3.65

Washers—Leather, Axle—

Solid .....80&10@80&10&10%
Patent .....90@90&5%
Coil: ¾ 1 1¼ 1¼ Inch.
10½¢ 11½¢ 12½¢ 16¢ per box

Iron or Steel—

Size bolt.... 5-16 ⅜ ½ ⅝ ¾
Washers....$5.90 5.00 3.70 3.50 3.30
The above prices are based on $5.50 off list.
In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ¼¢ to list.

Cast Washers—

Over ½ inch, barrel lots..... per lb. 1¼@2¢

Weather Strip—

Flexible Felt—

Lined, per 100 ft., $2; $3; $4.....40&10%
Moore's Unlined, per 100 ft., $2; $3; $4 .....50&10%

Wedges—

Oil Finish.....lb., ..@3¢

Weights—Hitching—

Covert Mfg. Co.....30&2%

Sash—

Per ton, f.o.b. factory:
Eastern District.....$30.00
Southern Territory.$23.00@$24.00
Western and Central Districts .....$22.00@$28.00

Wheels, Well—

8-in., $1.55; 10-in., $2.00; 12-in., $2.50; 14-in., $4.00.

Wire and Wire Goods—

Bright and Annealed:
6 to 9.....80%
10 to 18.....80&2½%
19 to 26.....80&7½%
27 to 36.....80&2½%
Galvanized:
6 to 9.....75&5%
10 to 14.....75&7½%
15 to 16.....72½&10&2½%
19 to 26.....75%
27 to 36.....72½%
Coppered:
6 to 9.....75&5%
10 to 14.....75&7½%
15 to 18.....72½&10&2½%
19 to 26.....75&10&5%
27 to 36.....75%
Tinned:
6 to 14.....75&10&2½%
15 to 18.....75&7½%
Brass.....24¢ lb., base
Copper .....32¢ lb., base
Cast Steel Wire.....50%

Spooled Wire—

Annealed and Tinned, 70&10@75&10%
Brass and Copper..60&10@65&10%
Retailers' Assortments, per box, $2.25@$2.50
Wire Clothes Line, see Lines.
Wire Picture Cord, see Cord.

Bright Wire Goods—

Steel Wire Goods.....90&10%
Brass Wire Goods.....85&25%
Brass Cup and Shoulder Hooks, 80&15%

Wire Cloth and Netting—

Galvanized Wire Netting..80&10%
Painted Screen Cloth, 100 ft., $1.30@—
Standard Galv. Hardware Grade:
Nos. 2, 2½ & 3 Mesh, sq. ft.3½¢
Nos. 4 and 5 Mesh, sq. ft..3½¢
No. 6 Mesh, sq. ft.....3¾¢
No. 8 Mesh, sq. ft.....4¼¢

Wire, Barb—See *Trade Report*

Wrenches—

Agricultural .....75@75&10%
Alligator or Crocodile..70&10@75%
Baxter Pattern S Wrenches... 70&5@70&10%
Drop Forged S.....45@45&5%
Acme .....60&10%
Alligator Pattern, 70%; Bull Dog..70%
Bemis & Call's:
Adjustable S, 40%; Adjustable S Pipe, 40%; Briggs Pattern, 40%; Combination Bright, 40%.
Steel Handle Nut.....50%
Combination Black.....40&5%
Merrick Pattern.....50%
Boardman's 40%
Coes' Genuine Knife Hdl..40&10&5&5%
Coes' Genuine Steel Hdl. 40&10&5&5%
Coes' Genuine Key Model..40&10&5&5%
Coes', Genuine Hammer Handle..... 40&10&5&5%
Coes' "Mechanics'"...40&10&10&5&5%
Donohue's Engineer.....40&10%
Eagle 70%
Elgin Wrenches, ₱ doz.....$6.25
Elgin Rethreading Attachment, only with one die, ₱ doz.....$6.25
Elgin Extra Dies, ₱ doz.....$3.00
Elgin Extra Jaws, ₱ doz.....$1.75
Elgin Monkey Wrench Pipe Jaws, ₱ doz.....$2.10
Gem Pocket.....20%
Hercules 10%
W. & B. Machinist:
Case lots.....50&5%
Less than case lots.....50%
W. & B. Railroad Special:
Case lots.....50%
Less than case lots.....40&10&5%
Solid Handles, P., S. & W.....50&5%
Stillson 65%
Vulcan Chain.....50%
Vaughan & Bushnell Mfg. Co. Handy, 70%; Always Ready.....50%

Fruit Jar—

Triumph Fruit Jar Wrench, 5 gross lots, ₱ gross, $7.50; ₱ doz.....$0.80

Wrought Goods—

Stables, Hooks, &c., list March 17, '02.....87½&10@—

Yokes, Ox, and Ox Bows—

Fort Madison's Farmers' & Freighters'.....list net

Zinc—

Sheet.....per 100 lb., $8.85@$9.10

For the Table of "Current Metal Prices" see the First Issue of Every Month.